

# The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXXVIII.

June 4, 1938

No. 988

## Tradition in Business

THE father-to-son tradition dies hard in British business; like many another tradition in our national life, it is being assailed to an increasing extent, on the one hand by the growth of "big business," and on the other by a section of political opinion which is opposed to inheritance in any shape or form. Fortunately for the stability of British industry, the family tradition is surviving to a degree which surprises both the advocates of amalgamation and nationalisation, and, incidentally, is apt to puzzle foreign observers of our institutions.

The simple explanation seems to be that when the fortunes of a particular family are bound up with the success or failure of a particular business, its members usually take the greatest pains to maintain and preserve what is, in fact, their life blood. At a time when finance is gaining an increasing hold on industry, and it is not uncommon for whole undertakings to change hands at the will of a handful of company promoters, it is clearly to the public good that some firms should be so controlled that their continuity is virtually assured. In cases where the principle of inheritance puts a man in control of a concern without the necessary qualifications, its fortunes soon begin to wane under the stress of competition. A family name may "carry" an undertaking on mere reputation for perhaps a generation, but modern salesmanship is becoming so efficient that a rival product is always waiting to take the place of any commodity which is not up to traditional standard.

The appointment of relatives to directorships is, of course, a practice which requires conscientious exercise, but the fact that a large number of such appointments are successful is not really surprising. In the daily conduct of most industries there is an "atmosphere" or technique, which a son brought up under the ægis of a family business absorbs from an early age. This is often a better background for business management than an orthodox training, while pride in the firm is another factor of incalculable value. Any family business that bears a well-established name is specially dependent on reputation; this is a guarantee of good service to the consumer. From the employees' standpoint the family tradition has much to commend it. The proprietors have something in common with the owner of a landed estate and a close personal relationship usually

prevails between the board and the staff. Round pegs in square holes can be adjusted by a process of trial and error, which is often denied to concerns whose sole aim is to please outside shareholders.

These thoughts are prompted by a booklet issued by a well-known engineering firm, George Kent, Ltd., of Luton, which celebrates its centenary this month. The event is unusually interesting because the firm has been controlled for a full century by father and son, the present chairman, Sir Walter Kent, being the son of the founder. Many firms have centenaries, but few have been conducted over the whole of that period by two successive generations of one family. Sir Walter Kent recalls his father's impressions of Napoleon; how at the time of Napoleon's escape from Elba, people feared that once again all Europe would be the battleground of that man of boundless ambition. Mr. George Kent was already thirty-one when Queen Victoria came to the throne, a year or two after he had set up in business; and his son went out to Australia in the 'seventies in a sailing ship, taking eighty-four days from London to Melbourne. Sir Walter adds that, as the centenary approaches, even the Great War seems to be fading into the memories of the past, but amid the changing scene of Europe, England remains a rock, democratic, stable and loyal. Reading the history of this typical family business, it becomes clear how much the country owes to the steady leadership of such men as have directed the firm of Kent through good times and bad.

The family tradition has been carried on in the ranks of the employees as well as on the board. Kent's first foreman was Thomas Cooper, who was followed by his son, John Cooper, and then by his grandson, Thomas Cooper, who has only recently retired. The firm was founded on the rotary knife-cleaning machine patented in 1844, but the constant development of new products saved it from decline when the machine was rendered largely obsolete by the invention of stainless steel. A ventilated refrigerator was patented in 1865, and was as great an advance on the ordinary ice-box in the preservation of food, as the further advance marked by the automatic refrigerator of to-day. In 1881 a contest over the right of the New River Co. to levy the water rate, which was taken to the House of Lords, attracted a partner in the firm to investigate the supply of

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*"Within a few years it is more than likely that the petroleum companies will be the main suppliers of industrial organic solvents."*

—F. N. Harrop.

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meters, and to-day George Kent, Ltd., supplies instruments for the measurement and control of fluids of all kinds. The firm's manufactures also include steering-gear for motor cars—the output is over 4,000 gears a week—electric motors, and clear-view screens.

Not the least remarkable feature of the century under review has been the great change that has occurred in the methods of manufacture. Up to the War, the machine-tools were, with few exceptions, of a general

purpose type, but to-day nearly all productions are made on the mass system with most scientific and up-to-date instruments and appliances, such as the remarkable jig-borer made by the Société Genevoise, the toolmakers' microscope and shadow projector, automatic welders and so on. A great engineering business has grown at Luton from small beginnings, and it is a tribute to the success of the family tradition that to-day the output is greater than ever before.

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## Notes and Comments

### Model Factory Planning

THE visit of the King to the Trading Estate at Hillington and its proximity to the Empire Exhibition at Glasgow has focused attention upon this flourishing young enterprise of Scottish Industrial Estates, Ltd. Less than a year ago, 320 acres of the estate were agricultural land, and a late hay crop was actually harvested on the site. To-day no fewer than 120 factories are in course of erection or are completed, and 60 tenants have been secured, the industries ranging from the manufacture of non-ferrous tubes and road machinery, to furniture, clothing and golf clubs. A recently issued booklet dealing with the features of the estate points out that most of the factories have been planned in standard units of 5,000 square feet. Three or four units are grouped together, so that a total area of 15,000 or 20,000 square feet is available under one roof. A notable feature is the absence of obstructions in the floor space; in the three-unit blocks, there are only four internal columns in the working space of 15,000 square feet. A smaller type of factory, planned in "nests" of seven units and offering a floor space of 1,200 square feet, can be rented for the small sum of one pound per week, inclusive of rates and heating. As tenants enjoy all the amenities of the estate, such as the canteen and garages, it is clear that the promoters are out to attract small firms as well as large, and no enterprise is too small to contribute its share towards the reduction of unemployment in the special areas.

### The Priestley Medallist

PROFESSOR M. T. BOGERT, of Columbia University, one of America's leading synthetic organic chemists, has been awarded the Priestley gold medal, which is the highest honour of the American Chemical Society. This medal, bestowed every three years, was established in 1923 in honour of Joseph Priestley, who discovered oxygen in 1774. Priestley came to America from England because of hostility toward his views as a nonconformist preacher. Professor Bogert recently addressed the 10th International Congress of Chemistry in Rome, and also attended the joint meeting of the Congress and the 13th Conference of the International Union of Chemistry as an official delegate of the United States Government. Twice president of the American Chemical Society, he organised the system of professional division through which the Society's membership of 22,000 now functions, and under his administration the official publication of the Society, *Industrial and Engineering Chemistry*, was founded. Professor Bogert has completed many investigations of the chemical compounds of the human body, and in recent years has worked on the synthesis of cancer-producing hydrocarbons. In collaboration with students, he is the author of more than 400 papers in the field of

synthetic organic chemistry alone. During the world war Professor Bogert was chief of the Chemical Service Section of the United States National Army. He has collaborated with the U.S. Department of Agriculture since 1926, and was chairman of the advisory board to the Colour Laboratory from 1926-31. He began his teaching career at Columbia as assistant in organic chemistry in 1894, and in 1904 was appointed first professor of organic chemistry. Previous recipients of the Priestley medal include Dr. Ira Remsen, president of John Hopkins University, and Dr. Charles L. Parsons, secretary of the American Chemical Society.

### Financing Research Associations

THERE have been doubts expressed from time to time as to how far the present methods of financing research associations—and incidentally other forms of research—are the best that can be devised. It is correct in principle that industries should contribute largely to their own research, and to that extent the present method is sound. It is also in accordance with the general practice in this country that contributions should be voluntary. From the point of view of the manufacturer there is apparently no better method. Nevertheless, many are assailed by doubts. It may be that subscribers to the associations have the advantage of non-subscribers, but research discoveries made in this way soon become common property, and in some bodies the annual publication of results, in the form of papers, permits all the world to share in the work that has been subsidised by the few. There can be no doubt, of course, that the work that is done by research associations should be available to industry in general—and it is in this respect different from private research—but in essence this is an argument against the voluntary system of providing funds.

### The Effect on the Staffs

IT is worth while also to consider the effect on the research staff of the voluntary method. There is evident in some research reports a rather desperate attempt to make the most of whatever results may have been achieved. Sometime, as always happens in research work, the year has been negative in results produced, but the most must be made of it. There is evidence in other reports that too large a number of problems has been investigated in view of the staff available, and the reader is left with the feeling that much of the work has been done to retain the interest of certain subscribers to the association. The research staff must feel under these conditions rather like the mass production workers of a factory, whose value is measured by output per unit of time. This is obviously entirely wrong, because research requires concentration upon the work, undisturbed by thoughts of whether or not funds will be available.

## The Corrosion of Tar Stills

### An Investigation of Causes and Prevention

**I**NVESTIGATIONS, carried out at the Chemical Research Laboratory on behalf of the Association of Tar Distillers, into the causes and prevention of the corrosion of tar stills, have been published by the Department of Scientific and Industrial Research as Chemistry Research Special Report No. 4 (Stationery Office, 9d.). The joint authors are D. D. Pratt, H. C. K. Ison and R. G. Wood.

It was in 1933 that the Association of Tar Distillers appointed a sub-committee to examine the problem of corrosion of tar stills under modern working conditions. When tars were chiefly of the horizontal retort type, 12 ton stills had an average life of 16,000 tons throughout, while instances of 30,000 tons were not uncommon. The introduction of vertical retort tar, however, had caused serious diminution in the life of stills, until, at the period under discussion, the average throughput of a still had fallen to 7,000 or 8,000 tons when dealing with tars composed approximately of 75 per cent. vertical and 25 per cent. horizontal retort tar.

It was generally accepted that decomposition of ammonium salts, such as the chloride and thiocyanate present in the aqueous liquor normally associated with tar, was responsible to some extent for the destruction of stills. Practical experience, however, showed that even after removal of such salts by washing, serious corrosion was noticeable and it was felt that some organic constituent, or group of constituents, in these vertical retort tars was chiefly responsible for the damage. To emphasise the urgency of the problem, it was calculated that reduction in the life of a still by 50 per cent. was equivalent to 5d. per ton of tar distilled and it was estimated that the total cost to the tar industry was of the order of £25,000 annually.

#### Difference in Composition of Tars

As a result of discussions at several meetings of the Tar Stills Corrosion Sub-committee of the Association of Tar Distillers it was agreed that detailed analytical examination of several varieties of tars now in industrial use would yield valuable data which might help in the elucidation of the problem of corrosion in tar stills.

As the introduction of vertical retort tars had intensified the problem, it was considered probable that the differences in composition between these tars and the older varieties, horizontal and coke oven tars, accounted in part at least for some of the deterioration of stills. Accordingly in March, 1934, the Chemical Research Laboratory, Teddington, undertook an investigation of such tars on behalf of the Association of Tar Distillers with the following objectives:—(1) To locate the compounds or groups of compounds responsible for corrosion; (2) to devise methods for the removal of such compounds or for the inhibition of their harmful action; (3) alternatively to discover a metal or alloy which would resist attack or to discover a protective coating for the mild steel then in general use as constructional material for tar stills.

To initiate the research, a tar of a corrosive nature, vertical retort tar, and a non-corrosive tar, coke oven tar, were obtained. To ensure that corrosion tests were carried out on primary constituents it was necessary to resolve these tars into components by methods which precluded decomposition, and the scheme of analysis developed by the Chemical Research Laboratory during an extended investigation of low temperature tars was considered a suitable method of attack. This scheme is based on the avoidance of high temperatures during distillation and on fractional precipitation by means of volatile solvents. After a preliminary analysis of the two tars in one kilogram samples these modified methods were applied to 5 gallon samples in large scale plant, and the various fractions isolated were then tested for corrosive properties.

Two corrosion tests were applied, one an eliminating test employing strips of mild steel and the other an extended series

of distillations in experimental stills. The active fraction having been narrowed down, it was possible then to test selected metals and protective coatings at any desired temperature in this concentrated material.

After an exhaustive examination of a long series of tar fractions, the following conclusions were reached. The corrosive effect of neutral and basic constituents was negligible, but at high temperatures, resinoids or petroleum insoluble phenols were very active in promoting corrosion, and in the presence of ammonium chloride the activity of these materials was intensified. The more volatile phenols were not corrosive, a fact which is confirmed in industrial practice where tar acid stills have a very long life. Resinoids are defined as those non-crystalline portions of tar soluble in caustic soda, and precipitated from solution in an organic solvent by addition of light petroleum. In a crude form they are isolated as a viscous pitch, but they can be purified to the condition of a brown amorphous powder.

#### Corrosive Action of Resinols

Low temperature tars are particularly rich in resinols, whereas coke oven and horizontal retort tars are almost devoid of such components. Vertical retort tars occupy an intermediate position with respect to this content of resinols. Further examination of the whole range of resinols revealed the fact that the portion soluble in benzene was much more corrosive than the insoluble part, probably owing to the circumstance that the latter, being highly polymerised, is almost inert. Confirmation of the conclusion that the corrosive effect of any tar is dependent chiefly on the content of benzene soluble resinols was obtained by comparative distillations of four tars.

The present report states that it is difficult to visualise any chemical treatment of tar which would neutralise or destroy the corrosive tendencies of resinols. Since, however, corrosion is experienced only at higher ranges of temperature, distillations have been carried out under reduced pressure and at temperatures up to but not exceeding 300° C. Under these conditions corrosion losses are substantially reduced without any diminution in the quantity of distillate.

A technique has been explored whereby the amorphous resinoids are precipitated leaving for distillation only the oily fractions of the tar. A long series of distillations in experimental stills has been carried out on the petroleum extract of a corrosive tar and it has been established that the corrosion caused by this fraction is much less than that manifested when a co-called "non-corrosive" tar is distilled. The precipitation of tar resinoids in general is most rapidly effected by the use of a colloid mill by means of which a mixture of tar with three times its volume of light petroleum is readily separated into a lower layer of resinoids and an upper layer consisting of tar oils dissolved in the separating medium. An alternative medium is available in the most volatile oils from low temperature carbonisation. Such oils would be of particular service to distillers who work up low temperature tars.

#### Stainless Steels Prove Satisfactory

Failing methods such as the foregoing process based on preliminary treatment of tars, a solution to the problem of corrosion of stills must lie in the direction of finding a constructional material which will withstand the action of the corrosive constituents of tars, namely, the resinols, either with or without the joint attack of ammonium chloride. Efforts made to develop a protective coating for mild steel were unavailing, but experiments showed that nickel-chromium steels containing 2.5 Ni and 0.6 Cr were moderately resistant to the action of resinols whereas the stainless steels tested were quite unattacked. Alloys of composition 80/14/6 Ni Cr Fe and of 60/40 Ni Cu were also very resistant.

Special reference to the resinoids of low temperature tar is made as an appendix to the report. It is stated that when low temperature tar is treated with petroleum b.p. 40°-60° C. in the ratio of 1 to 3, approximately 30.0 per cent. of the tar remains undissolved. This petroleum insoluble fraction consists of four classes of resinoids for which the Chemical Research Laboratory has adopted the following generic terms:—*Resinenes*—neutral resins insoluble in acids and alkalis. *Resinols*—phenolic resins soluble in caustic alkali. *Resinamines*—basic resins soluble in acid. *Resinoic acid*—acidic resins soluble in sodium bicarbonate solution or aqueous ammonia.

Accordingly there is a resin corresponding with each of the major fractions of tar, namely neutral oils, phenols, bases and carboxylic acids. Each of these resins on repeated precipitation by petroleum from its solution in organic media can be obtained as a pale yellow to brown amorphous powder dissolving readily in organic solvents such as acetone and pyridine. On evaporating the solvent, the resin is recovered as a tough transparent film. By graduated solvent extraction each group of resinoids can be separated into a further series of fractions. The ether soluble fraction is the least polymerised portion having a molecular weight of approximately 1,000.

When subjected to dry distillation these resinoids decompose with partial carbonisation at 150° C, approximately, yielding a distillate of oil and water. The following table records the ultimate analyses of three groups of resins:—

Analysis	Resinenes	Resinols	Resinamines
C. per cent	78.5	65.4	80.9
H "	6.4	4.8	5.9
N "	2.8	1.5	6.8
S "	nil	2.0	nil
O " (by diff.)	12.3	26.3	6.8

These resins are readily hydrogenated in the presence of molybdenic oxide and sulphur to yield mobile oils and it is noteworthy that after hydrogenation neutral resins furnished oils containing both phenols and bases. In addition to phenols and neutral oils, hydrogenated resinols produced volatile bases and ammonia but the oily distillate from hydrogenated resinamines contained no phenols.

## World Power Conference

### Forthcoming Meeting at Vienna

THE 1938 meeting of the World Power Conference, to be opened at Vienna on August 25, will deal in part with the supply of energy to small-scale industries. Of the 200 papers to be presented 13 are from Great Britain.

The authors of the British papers are mainly members of the gas, electrical, oil and solid fuel industries. Mr. P. H. Herring, of the engine research branch, Anglo-Iranian Oil Co., Ltd., and Mr. H. F. Jones, technical representative of the International Association (Petroleum Industry, Ltd.), are jointly responsible for a paper on "Petroleum Fuels for Small-scale Industries"; Mr. W. Dieterichs, of the Gas Light and Coke Company, deals with "Gas for Small-scale Industries." Sir Harold Hartley, who is chairman of the Fuel Research Board, is also chairman of the International Executive Council of the World Power Conference and of the British National Committee. Electrical supply for small-scale industries will be dealt with jointly by Mr. J. N. Waite, who has recently left his position as city electrical engineer of Hull to join the Central Electricity Board, and Mr. F. H. Clough, assistant chief engineer of the British Thomson-Houston Co., Ltd.

The official opening meeting in the Vienna Concert House is at 10 a.m. on August 25, and allowing Saturday and Sunday for sight-seeing, the meeting continues until September 2, when a second week begins devoted to hours of exceptional interest.

Full particulars of the fortnight's programme, charges, accommodation, etc., may be obtained from the Secretary, British National Committee, World Power Conference, 36, Kingsway, London, W.C.2.

## Plastics and Glass

### Forms of Competition and Co-operation

REPRESENTATIVES of the glass industry had discussions with leaders of the comparatively new industry of plastics at the fifth British Glass Convention at Droitwich on May 20.

In the words of Professor W. E. S. Turner, the glass technologist, who reviewed the discussions at an official luncheon, the experts in plastics tried to show that, by their very existence, they were doing a good turn to the glass industry, which need have no fears concerning the success of these new manufacturers. But most of the delegates to the Convention, Professor Turner conjectured, were only half convinced that such was the case. During the discussions, the convention delegates were shown plastic containers, capable of manufacture in great numbers at low prices, and objects which showed the ease with which even school children can achieve beauty by manipulating plastics. They were given many striking examples of ways in which plastics are challenging glass in the market, and other examples of useful co-operation by the two industries.

### Transparent Plastic Sheets

Dr. V. E. Yarsley, a consultant in the manufacture of cellulose plastics, said it was a mistake to regard plastics as substitutes. They ranked as a material with wood, metal and glass. It was fairly safe to say that the wonderful inorganic plastic, glass, had inspired much work that had been done in producing new transparent plastic materials. In aircraft construction, where low weight must be combined with absolute security and good optical properties over a wide range of weather conditions, organic glass had no rival. Methacrylate plastic and cellulose acetate were being used extensively for aircraft, and a considerable degree of perfection had been attained in obtaining a glass-like preparation and in the intricate shaping of the plastic from flat sheets. This manipulation of plastic material had opened a new field in the production of skeleton machines used in exhibitions.

The safety of transparent plastic sheets had attracted the attention of authorities concerned with air raid precautions. Glass could be made splinter-proof with a covering of cellulose acetate. This material was being used for the "windows" of millions of civilian gas-masks. The high ultra-violet light transmission of cellulose acetate plastic had accounted for the growing use of wire-supported cellulose acetate sheet by horticulturists and market gardeners. A striking incursion into the field of glass was the mass production of lenses and prisms of plastic, but that section of the plastics industry was still in its infancy.

### Advantages of Laminated Material

Mr. L. J. B. Forbes, another plastics expert, said that the Admiralty had found that a laminated material composed of plastics and glass was the only one that would not splinter when subjected to the firing of guns in some parts of warships. The same applied to the production of bullet-proof "glass." In some branches of engineering it was found that laminated bearings were better than brass or white-metal bearings, and one British motor manufacturer had introduced, for the first time in the world, a plastic bearing in the torque stabiliser. In Germany plastics had been developed to an enormous extent. A complete car of plastic materials had been assembled by the Auto Union Co., and was regarded already as 85 per cent. a success. Another use of plastics was the production of the first brush without bristles—a piece of plastic with grooves, which cleaned clothes by virtues of its electrostatic properties.

Dr. Yarsley promised to present a collection of plastics for display in the new building of the Society of Glass Technology at Sheffield.

## Fuel Research Station

### Running Lorries on Producer Gas from Solid Fuels

THE Fuel Research Station at Greenwich was visited on Tuesday by over 300 representatives of science and technology from all parts of the country. They were received by the Director of Fuel Research, Dr. F. S. Sinnatt, C.B., M.B.E., F.R.S. The Fuel Research Station is the headquarters of the fuel research organisation of the Department of Scientific and Industrial Research and is equipped not only with laboratories but with semi-commercial scale plant which is necessary if the result of experiments on the utilisation of coal are to be directly translated into practice by industry.

In addition to the Fuel Research Station there are nine laboratories in the principal coalfields of the country and these are engaged on a study of the coals as they occur in the ground. Actual pillars of coal are obtained at the coal face, transported to the laboratories and there examined in detail. A sample pillar was on view together with a striking X-ray photograph prepared from a slice cut from the same pillar. This showed the distribution of the inorganic matter in the coal seam. A number of specimens showed in a manner the great variations that are found in coal and the impurities which it may contain.

Examination of the seams has now reached a stage when various generalisations emerge and it is possible in many cases to prepare maps showing the change in the character of the seams as they extend over the coalfield. Some of these were on view showing which areas of the field provide different types of coal specially suitable, for example, for gas making or steam raising, and make it possible to predict the type of coal that might be met with in those areas where it is not yet worked.

An investigation of interest is the precise information being obtained upon the burning of coal in the ordinary domestic open grate. Experiments are being carried out in two specially built rooms so arranged that they are gas-tight except for one definite entrance for the air, which is accurately measured as it enters the room, and, of course, for the chimney. The heat radiated from the fire and the smoke emitted from the chimney can be determined and instruments give a continuous record of these measurements throughout the life of the fire. The results indicate that the smoke emission depends on many factors including the quality of the coal,

the size of the coal, the relative proportion of air entering below and above the fire, the brickwork setting round the fire and the design of the grate.

The possibility of converting lorries fitted with petrol engines to run on producer gas generated from solid fuels on the vehicle itself is being investigated. Two vehicles were shown, one, a one-ton lorry, and the second, a five-ton lorry. The first was fitted with a producer made by a British firm and was being used to compare the efficiency of a number of types of solid fuel, including charcoal, low temperature and other cokes and anthracite. The five-ton lorry was fitted with a producer which has been designed at the Fuel Research Station, with a view to studying the principles of producer construction and to obtain a producer which can be used with a large variety of fuels.

The production of motor spirit and diesel oil by the synthesis of carbon monoxide and hydrogen is being studied and a plant producing 5 litres of liquid oils a day was seen in operation. The plant also produces waxes and from these and fractions of the oils produced a number of other products can be obtained, including lubricating oils, esters and soaps.

The water-gas plants at the station have been modified to use coal instead of coke and weakly caking coals both high and low in volatile matter have been gasified successfully. This enables coals not normally suited for gas making to be used for providing some of the gas required for many purposes. It is, however, rather too poor a gas for ordinary town's use and experiments are in hand for enriching this gas to bring it up to the required level of calorific value by means of a catalytic synthesis of part of the carbon monoxide and hydrogen to methane. Another modification of the plant enables a gas particularly rich in hydrogen to be produced; such gas is especially suitable raw material for the synthesis of oils.

Other plant on view included the gas retorts used for the low temperature carbonisation of coal and a setting of chamber ovens being used for the study of the effect of blending strong and weakly caking coals, the object being to conserve the strongly caking coals of the country. A striking demonstration was given to show how the dust raised in the handling of coal could be largely reduced by spraying the coal with a small quantity of oil.

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## Water Supplies and River Pollution

### Annual Report of the Water Pollution Research Board

THE tenth annual report of the Water Pollution Research Board has been issued by the Department of Scientific and Industrial Research. The Board carries out research mainly on the treatment of water for domestic supply and for other purposes, the treatment and disposal of sewage and trade effluents and on problems of river pollution.

Experiments have been continued on the preparation of materials for softening water by the base-exchange process. This process is used in household water-softeners and is also employed on a large scale at a number of waterworks. The investigations of the Board have shown that satisfactory water-softening materials can be prepared from fullers earth, which is found in parts of the British Isles. According to the method of treatment finally adopted, the fullers earth is first mixed with a solution of hydrochloric acid; it is then dried, baked at about 600° C. and treated with solutions of sodium silicate and sodium aluminate. The base-exchange capacity of the final product depends on the type of fullers earth used; yellow, weathered varieties are the most satisfactory.

The discovery that acids, bases and salts can be removed from solution in water by means of synthetic resins has aroused widespread interest both in this country and abroad. It has been shown, for example, that fresh water can be prepared from saline water by treating it first with a suitably prepared base-exchanging resin and then with an acid-exchanging resin. The removal of traces of deleterious substances from water used for domestic supply or other purposes is desirable in many parts of the world. For example, it is known that a defect of the teeth, known as "mottled enamel," may be caused by drinking water containing as little as one part per million of fluorine in the form of compounds. Experiments are in progress to determine whether these compounds can be removed from water by treatment with suitable resins. Again, in recent years considerable attention has been given by agricultural chemists to the presence of compounds of boron in water used for irrigation; certain plant diseases are caused by excessive or insufficient concentrations of these compounds. Recent work in the programme of the

Board has shown that partial removal from water of boron compounds is effected by treatment with a resin prepared from a tannin.

Certain types of water take up appreciable quantities of lead from lead pipes and fittings. An investigation is in progress to determine the average quantities taken up by waters of different types under the conditions of household supply. A method is used in which a volume of 50 to 300 gallons of water is passed through a meter and then through a filter containing a mixture of chalk and magnesia, which takes up the whole of the lead from the water; the amount of lead taken up is determined by analysis. Apparatus of this type has been tested in eight towns in England and Scotland. Average concentrations of lead ranging from less than 1 part per 10 millions to as much as half a part per million of water have been obtained.

Work on the purification of waste waters from dairies and milk products factories, which is being carried out in collaboration with the milk industry, has been continued. One of the most important results of the work has been to show that the loss of valuable products and by-products carried away with the waste waters from dairies and milk products

factories can be considerably reduced by inexpensive modifications in the manufacturing processes. The work of the Board has shown that the unavoidable waste waters from dairies can be purified by processes similar to those used for the treatment of sewage. The most suitable method has been found to be biological oxidation in percolating filters operated under certain conditions. Several large-scale plants using this process have now been erected at various dairies. During the past year it has been shown that waste waters containing whey, from cheese factories, can be purified by methods similar to those which have been found suitable for waste waters from dairies and milk depots.

Work in progress on sewage disposal includes investigations on the bio-chemical and biological processes of purification of sewage by activated sludge process and on the removal of organic matter by flocculation and sedimentation.

The River Mersey investigation was undertaken to ascertain the effect of the discharge of crude sewage on the amount and hardness of the solid matter deposited in the estuary. The investigation has led to very definite conclusions, which have been fully set out in a report published by the Stationery Office.

## Schools of Life

### Eton Headmaster's Tribute to Boys' Hostel

THE sum of £3,565 15s. 9d. was raised on behalf of the Boys' Hostel Association, which embraces the John Benn Hostel, Stepney, and King George's House, Stockwell, at the annual dinner held at the Dorchester Hotel, on Thursday, May 26. Lord Leverhulme, president of the Association, occupied the chair and the chief guest was Mr. Walter Elliot, M.P., the Minister of Health.

#### The Young Citizen

The Headmaster of Eton College (Mr. C. A. Elliott) who proposed the toast of "The Young Citizen," observed that it was a fitting duty for the headmaster of a public school to perform. The public schools had survived till to-day, he said, not only as centres of academic learning but as schools of life. The boys hostels too, were trying to teach boys how to live—which was a very different thing from teaching them how to earn their living—as well as giving them a home to live in. Like the public schools they were trying to do so, not by continuous precept—for the effect of exhortation was fortunately, perhaps, less than most people imagined on the English young—but by throwing boys together in the life of an ordered and self-respecting community where by a proper balance of control and freedom each boy played his part and contributed to the well-being of all.

Mr. John Benn, who responded to the toast, said his friendship with the boys at the two hostels entitled him to speak for them on that occasion. From discussions he had had with the boys on many topics, he could give an assurance that the boys' outlook was not very different from their own. They were generous, candid and courageous, and appreciated to the full the privileges which the Association offered them, and were as proud of their hostels as any Etonian or Harrovian was of his school. For evidence of this it was only necessary to see the number of articles of equipment which they had made themselves after a long and hard day's work.

The young citizen, Mr. Benn went on, was confronted with many serious and perplexing problems. He saw men in some factories working overtime because goods could not be produced fast enough, and he saw men in other trades unemployed because there was not sufficient work. He was even prevented from following a certain occupation because his fellow workmen would not allow more than a set number of

apprentices to be employed. Those who recognised the advantages available to the young citizen, however, would not be pessimistic of the future. There was a tremendous amount of goodwill about in England.

"Boys from the special areas," declared Mr. Benn, "are being accommodated at the hostels and made to feel that they are wanted and not just condemned to the scrapheap. There are drawbacks to the migration of young labour from one part of the country to another, but as far as the hostels are concerned the boys can only secure benefits. If industry can be distributed more evenly over the country the day may come when the boys will go back to their native areas as leaders."

He (Mr. Benn) ventured to think that the two million pounds given by Lord Nuffield to the special areas was a recognition of the responsibility of business towards what was essentially a business problem. There was a tendency to-day to mix business with charity, and while business was named after Sir Ernest's father, and Sir Ernest had him-businesslike, as those who were acquainted with the work of the hostels would agree. "The young citizen," Mr. Benn concluded, "has great opportunities for personal and social progress and he is not letting those opportunities slip."

#### Well-Being of the Community

Mr. Walter Elliot proposed the toast of the Boys Hostel Association. He understood, he said, that King George's House at Stockwell owed a good deal to the support and beneficence of King George's Jubilee Trust, of which his wife was a member. "Mrs. Elliot assures me," he added, "that the Boys Hostels Association is an eminently worthy cause and one which a Minister of State should commend to the rest of the public."

Lord Leverhulme, replying to the toast, said that the interest of the Ministry of Health in the work of the hostels was a testimony to the fact that the Ministry recognised that what the hostels were doing was a definite contribution to the health, fitness and well-being of the community. He went on to pay tribute to the assistance he had received in fulfilling the duties of his office as president from his predecessor, Sir Ernest Benn. The John Benn Hostel, he said, was named after Sir Ernest's father, and Sir Ernest had him-

self stamped his own unique personality upon the work ever since it was begun.

The hostels' camping site at Tonbridge, of which they had enjoyed the use for a number of years, Lord Leverhulme announced, had recently come into the market and they had been able to secure it freehold for £1,250. He considered that the owners of the site, Imperial Chemical Industries, Ltd., had dealt with them very generously throughout the negotiations, and they had shown, in tempering the wind to the shorn lamb, that they appreciated the kind of work which the prospective purchasers were doing for the young community of London.

Captain Wedgwood Benn, M.P., proposed the toast of the guests. Referring to the presence of the chief guest, the

Minister of Health, he said it was something in these times, when the weight of affairs was very great, that a member of the Cabinet should be prepared to spend an evening at the service of even so good a cause as the Boys Hostels Association. One of the most striking facts about the hostels, he added, was that not a single boy living in them was unemployed, and there were employers waiting for the next boy from the hostels who would be good enough to place himself at their disposal.

Mr. Gordon Selfridge, replied on behalf of the guests. Mr. William Ferris, secretary of the John Benn Old Boys Club, proposed the toast of the chairman, and in response, Lord Leverhulme thanked the guests for their generous support of the Association.

## The Chemical Age Lawn Tennis Tournament

### Results of First Round Matches

THE matches in the first round of the eighth annual CHEMICAL AGE Lawn Tennis Tournament were completed on Monday, and the results are given in the following pages. Except in the case of the finals, players drawn against each other must make their own arrangements for playing off the match on a court mutually agreed upon. In the event of disagreement the first name drawn has the right to choose the ground. The best of three advantage sets will be played in each round; except in the semi-finals and finals when the best of five sets will be played.

It is important that competitors should bear in mind the closing dates for the various rounds as shown at the head of each of the two draws. Results must be sent to the Editor of THE CHEMICAL AGE immediately after the match, and must in any case reach him not later than first post on the day following the final day for playing off the round.

While there will be no new draw for each successive round, a draw will be made for the right of choice of ground and competitors will be notified accordingly.

### Men's Doubles

Players drawn against each other must make their own arrangements for playing off their match on a court mutually agreed upon. In the event of disagreement the first drawn shall have the right to choose the ground. The asterisk (\*) indicates the first name drawn. Best of three advantage sets, except in the case of the semi-finals and final.

FIRST ROUND	SECOND ROUND	THIRD ROUND	SEMI-FINAL	FINAL
Results to be notified by May 30	Results by June 20	Results by July 11	Results by August 16	September 3
Clifford Thedford and Idris Williams	.....bye.....	}	}	}
T. P. Williams and C. C. Gough.....	.....bye.....			
J. W. Parkes and E. J. Allday.....	.....bye.....			
*G. F. Hammond and L. Giltrow.....	*Hammond and Giltrow	}	}	}
Ronald Porter and Maurice King.....	7-5, 1-6, 8-6.....			
*W. R. Lewis and S. Barnes.....	*Sleep and Darton			
R. J. Sleep and F. Darton.....	6-3, 2-6, 6-1.....	}	}	}
*J. I. T. Jones and R. M. O. Williams	Haughton and Wakeman			
G. Haughton and W. Wakeman.....	w.o.....			
*A. S. Marcar and F. G. Crosse.....	*Marcar and Crosse	}	}	}
R. Hawkes and M. Barford.....	6-2, 1-6, 6-3.....			
*A. H. Tickner and J. S. Wilson.....	Tickner and Wilson			
L. A. Maronge and J. Hudson.....	7-5, 6-3.....	}	}	}
*W. H. Herridge and J. S. Eastwell...	Bartram and Martin			
J. H. Bartram and C. H. Martin.....	w.o.....			
*E. G. Floyd and C. G. Copp.....	*Willshire and Grape	}	}	}
A. E. C. Willshire and L. F. Grape..	6-3, 6-0.....			
*F. O'Connor and E. D. Lacy.....	Triggs and Chamberlain			
A. E. Triggs and W. Chamberlain...	w.o.....	}	}	}
*G. W. Hole and C. G. Smith.....	*Hole and Smith			
R. A. Champkin and A. A. Killick...	6-1, 6-2.....			
*R. E. Hives and A. E. Hughes.....	*Eyres and Hoppe	}	}	}
A. F. Eyres and W. Hoppe.....	6-3, 6-4.....			
J. H. G. Plant and T. Bispham.....	.....bye.....			
D. G. Blow and R. J. Wood.....	.....*bye.....	}	}	}
J. K. Woollard and E. T. Hancock...	.....bye.....			

# The Chemical Age Lawn Tennis Tournament

## Men's Singles

Players drawn against each other must make their own arrangements for playing off their match on a court mutually agreed upon. In the event of disagreement the first name drawn shall have the right to choose the ground. The asterisk (\*) indicates the first name drawn. Best of three advantage sets, except in the case of the semi-finals and final.

FIRST ROUND Results to be notified by May 30	SECOND ROUND Results by June 20	THIRD ROUND Results by July 11	FOURTH ROUND Results by August 2	SEMI-FINAL Results by August 22	FINAL September 3
C. W. E. Walker.....	.....*bye.....				
E. Pavitt.....	.....bye.....				
A. L. Temple.....	.....*bye.....				
Edwin Whittaker.....	.....bye.....				
Clifford Thedford...	.....*bye.....				
C. C. Gough.....	.....bye.....				
P. A. Tunstall.....	.....*bye.....				
T. P. Williams.....	.....bye.....				
J. W. Parkes.....	.....bye.....				
*H. G. Wyrill.....	} *Wyrill, 6-1, 6-1..				
Ernest G. Shoyer...					
*L. F. Grape.....	} Grape, 6-2, 6-4...				
F. G. Crosse.....					
*Gerald Pugh.....	} *Pugh, w.o. ....				
J. E. Walker.....					
*J. I. T. Jones.....	} *Sleep, w.o. ....				
R. J. Sleep.....					
*F. Darton.....	} Hinchcliffe, w.o.				
P. E. Hinchcliffe....					
*W. Hoppe.....	} *Hoppe, w.o. ....				
A. Cosgrove.....					
*A. S. Marcar.....	} Fyres, w.o. ....				
A. F. Fyres.....					
*G. L. Rolfe.....	} *Hammond 6-2, 6-2				
G. F. Hammond.....					
*L. Giltrow.....	} Giltrow, w.o. ....				
D. G. Blow.....					
*A. W. A. Goudie...	} *Goudie, 6-0, 6-1				
E. D. Lacy.....					
*A. H. Tickner.....	} Tickner, 6-4, 6-2				
W. Wakeman.....					
*E. A. Thomsett....	} Thomsett, w.o.				
H. H. Lusty.....					
*S. E. Bones.....	} *Haughton, w.o.				
G. Haughton.....					
*Ronald Porter.....	} Porter, 6-2, 4-6, 6-1				
R. A. Champkin.....					
*G. W. Hole.....	} *Hole, 6-2, 6-1 ...				
E. T. Hancock.....					
R. M. O. Williams }	} *Williams, 6-1, 6-1				
J. H. G. Plant.....					
*S. Barnes.....	} Bowler, w.o. ....				
H. Bowler.....					
*H. L. Shead.....	} Hughes, 6-1, 6-1				
A. E. Hughes.....					
*R. J. Wood.....	} *Copp, w.o. ....				
C. G. Copp.....					
*W. R. Lewis.....	} *Lewis, 6-0, 6-3..				
J. K. Woollard.....					
A. A. Killick.....	.....bye.....				
L. A. Maronge.....	.....bye.....				
G. A. Hanson.....	.....*bye.....				

## Letter to the Editor

### Heavy Oil, Anthracene Oil

SIR,—Confusion exists in the tar industry with regard to the nomenclature of high boiling tar oils. The Association of Tar Distillers and the Standardisation of Tar Products Test Committee have decided that the fraction of coal tar which distils above about 270° C. shall be given the title "heavy oil." The type of heavy oil which has a specific gravity above about 1.080 is to be referred to as anthracene oil, and an indication is always to be given as to whether the oil under discussion is filtered or unfiltered. The words "strained" and "unstrained," now in frequent use, are to be abandoned as technically wrong, and it is hoped that the technical Press, when quoting such oils, either technically or in market reports, will support the decision and use the descriptions "filtered" and "unfiltered."—Yours faithfully,

J. DAVIDSON PRATT,

The Association of Tar Distillers,  
166 Piccadilly, London, W.1. Secretary.

## Chemical Matters in Parliament

### Power Alcohol Production, Revenue Control

IN the House of Commons on May 30, Mr. W. T. Kelly asked the Chancellor of the Exchequer whether he would make an estimate of the cost of customs and excise supervision over the production of power alcohol in this country?

Sir J. Simon, in a written answer, said he assumed that Mr. Kelly had in mind the cost thrown upon distillers by restrictions imposed by law for purposes of revenue control. Any such estimate must necessarily cover all alcohol whether used in the manufacture of power methylated spirits or industrial methylated spirits or used duty-free in arts and manufactures under Section 8 of the Finance Act, 1902; it could only be made after prolonged inquiry at the distilleries, upon which he was not, as at present advised, satisfied that there was ground for embarking.

Mr. David Adams asked the Chancellor of the Exchequer whether he would give a list of the companies to which the bounty of 8½d. per gallon on power alcohol was paid, and of the sums of money paid to each during the last financial year?

Sir J. Simon, in a written answer, stated that it would be contrary to practice to disclose particulars relating to the business of individual firms.

### Land Fertility Scheme

On May 30, Sir H. Morris-Jones asked the Minister of Agriculture what quantity and value of basic slag and lime was used in the county of Denbigh calculated on the basis of the Exchequer contribution under the Agriculture Act, according to the latest available figures?

In a written answer Mr. W. S. Morrison said the Land Fertility Scheme came into operation on September 6, 1937. Up to and including May 21, 1938, 2,346 applications for contribution under the scheme had been received from the county of Denbigh, covering 9,353 tons of lime and 3,721 tons of basic slag, of an estimated value (delivered) of £18,600, and £12,000 respectively.

### Shale Oil Production

On May 31 Major Proctor asked the Secretary for Mines (1) what amount of motor spirit was produced from shale in the United Kingdom during 1937; and (2) what amount of diesel oil was produced from shale in the United Kingdom during 1937?

In reply Captain Crookshank said by courtesy of Scottish Shale Oils, Ltd., he was able to inform the hon. Member, in reply to his questions, that, during 1937, the company produced about 7½ million gallons of motor spirit and 14½ million gallons of diesel oil.

## Institute of Physics

### Annual Meeting and Report

THE annual general meeting of the Institute of Physics was held on May 25, when the following were elected to take office on October 1, 1938: President, Dr. C. C. Paterson; vice-president, Mr. T. Smith; hon. treasurer, Major C. E. S. Phillips; hon. secretary, Professor J. A. Crowther; new members of the board, Dr. J. D. Cockcroft and Mr. E. B. Wedmore. Sir Frank Smith, secretary of the Department of Scientific and Industrial Research, was elected an honorary fellow.

The annual report for 1937, which was adopted at the meeting, shows that the membership continued to increase in a most satisfactory way, and at the end of the year was just over one thousand, so that the Institute can now be considered as representative of British physicists both at home and overseas. The more important activities of the Institute during the year covered by the report, included the second Conference on Industrial Physics, held at Birmingham University during March, 1937. The subject chosen for the conference was "Optical Devices in Research and Industry" and its chief object was to draw attention to the importance of such devices in modern industrial practice. About 400 people attended the conference, the majority of whom were engaged in Government and industrial research laboratories, not only in the Midlands, but also in other parts of the country. Twenty-three firms and research organisations were represented at an exhibition of apparatus, instruments and books cognate to the subject of the conference which was held in the physics laboratories of the University.

During the year under review there was a further increase in the number of vacancies for physicists of which the Institute was notified, the figure being 197. Several candidates were successful in obtaining posts through the medium of the appointments register, some of which were not advertised vacancies. It was also found possible to fill a few vacancies for laboratory assistants from among those holding the Institute's certificate in laboratory arts.

The scope of the *Journal of Scientific Instruments* has now been enlarged to include items dealing with the applications of physics in industry, and it has been arranged to include periodic reviews of progress of foreign scientific instruments and apparatus.

## Institute of Fuel

### Students' Medal to be Awarded

TO encourage the reading of papers by students of fuel technology, the Council of the Institute of Fuel have decided to make an annual reward of a medal, together with a prize consisting of books and/or instruments to the value of £5.

The award will be made to student members of the Institute or to any student under 25 years of age of a university or technical college in the United Kingdom. The paper must deal with some subject relating to the preparation or utilisation of fuel, or allied subjects, and must be submitted to the secretary of the Institute under a "Nom de Plume." Papers must be received by the secretary on or before September 1 in any year. The name of the successful competitor in each year will be announced at the October meeting of the Institute, and the award presented at the annual dinner, at which the prize winner will be the guest of the Institute. Papers must be limited to a maximum content of 6,000 words, and may be illustrated by line drawings or photographs.

One medal and prize will be available for award each year. The Institute, however, reserves the right to withhold granting a medal in any year if, in the opinion of the papers committee, no applicant deserves the award. The paper earning the award may be published in the *Journal* of the Institute.

PLANT FOR THE ELECTROLYTIC REFINING of crude copper is to be built by the firm of A. Tonolli, of Milan.

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## Trisodium Phosphate for Water Softening

### An Outline of the Budenheim Process

**A**N improved method for softening boiler feed water with trisodium phosphate has come to the fore. Known as the Budenheim process, it is claimed that it secures complete immunity against incrustation, sludge and corrosion by means of a comparatively simple installation.

Softening is carried out in three stages. In the first or "thermic stage" the raw water is fed at the summit of a cascade preheater, evolved after numerous experiments, and as it flows down over the plates of the preheater, it is heated by any kind of waste steam (even if the latter contains oil), or if necessary by live steam, so as to be kept very closely to the boiling point, the temperature being regulated by a suitable thermostat. By dint of the flow of the water, combined with sufficient heating, the dissolved gases (oxygen and carbon dioxide) are expelled, while at the same time the bicarbonates are to a large extent destroyed owing to the liberation of carbon dioxide.

The second stage is known as the "alkaline pre-softening stage." In this stage the heated raw water is mixed with alkaline water returned from the boiler by means of a pipeline, whereby the hardening constituents of the raw water enter into reaction with alkaline salts of the boiler water. The caustic soda takes up the bicarbonate and carbonic acid which are still present in the raw water, and at the same time sodium carbonate is formed which precipitates the non-carbonate hardness. A twofold result is attained thereby. A very considerable proportion of the hardness of the raw water is removed without any expense for chemicals and the alkalinity of the boiler water is usefully reduced. It is thus possible, by returning the boiler water, to keep the alkalinity of the boiler water within the prescribed limits.

#### Phosphate Sludge Easily Filtered

Trisodium phosphate, in the form of a 10 per cent. solution, is added in the third stage; this results in the precipitation of all the remaining hardening constituents. The phosphate sludge is easily filtered, and a feed water is thus obtained which is entirely free from hardness and sludge, so that no scale or sludge can be deposited in the feed lines, economiser or boiler. The precipitation of hardness by the addition of trisodium phosphate leads to the formation of sodium carbonate, which passes on to the boiler, where it is partly converted into caustic soda. Both constituents so obtained serve for the alkaline presoftening stage, as mentioned above.

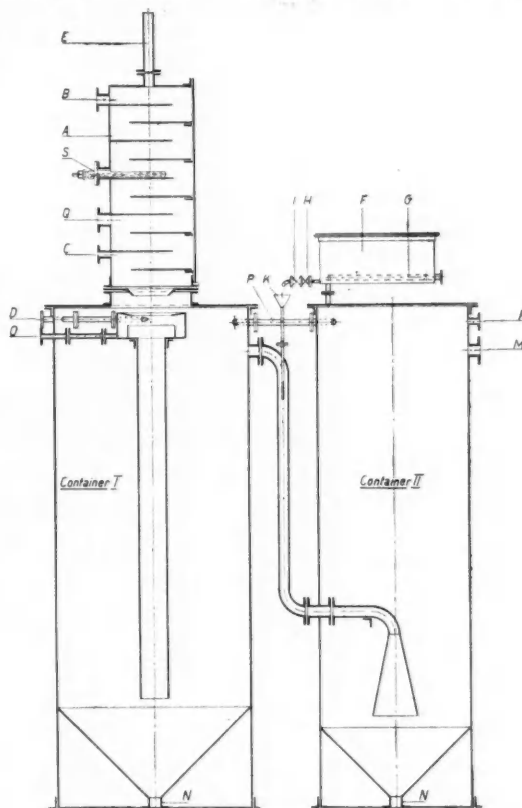
In carrying out the Budenheim process about 2 ounces of trisodium phosphate (containing about 20 per cent.  $P_2O_5$ ) is needed per degree of total hardness and per 1,000 gallons of water. If calcined trisodium phosphate (containing about 40 per cent.  $P_2O_5$ ) is used the consumption is about half that amount.

Any existing scale is gradually decomposed and removed by this treatment, but in the period during which this process is occurring the consumption of trisodium phosphate is necessarily larger. No excess of trisodium phosphate is required for the purpose of securing practically zero hardness, but the addition of trisodium phosphate should in any case be sufficient, so that for the sake of safety (*i.e.*, to allow for any lack of supervision and prevent corrosion) some slight excess of trisodium phosphate can be ascertained. A very simple test which can be carried out by any foreman or stoker is available in order to control the maintenance of this excess.

As a rule no blow-down discharges of boiler water are necessary and the main cause of foaming and priming is entirely avoided, the sludge forming constituents being removed from the bottom of the containers from time to time. Finely divided impurities which may be present can be effectively dealt with as suspended matter of this kind is carried down by the flocculent phosphate precipitate. Oil containing

waste steam may be used without difficulty for heating the cascade preheater, and in cases where condensed steam is oily, it is passed into the correspondingly enlarged container for the trisodium stage. The condensate is thus completely freed from oil and any existing hardness is removed at the same time. In this latter case the filter must, of course, be enlarged according to the volume of condensate.

For boiler houses where space is scarce a tubular plant has been devised. This tubular plant enables the former time of reaction of one hour to be reduced to less than one minute,



The Budenheim Process Water Softening Plant.

(A) Cascade Preheater. (B) Raw Water Feed. (C) Live Steam. (D) Water returned from Boiler. (E) Ventilation. (F) Container for Trisodium Phosphate Solution. (G) Heating Coil. (H) Stop Cock. (I) Regulating Valve. (K) Trisodium Phosphate Inlet. (M) Outlet to Filter. (N) Valve for removing Sludge. (O) Outlet for Boiler Water. (P) Steam Channel. (Q) Waste Steam Inlet. (S) Thermostat.

and this apparatus is of such small dimensions that it can be erected even if the available space is very limited. In comparison with the containers hitherto used, a saving in iron of over 90 per cent. is effected, and all the advantages of the Budenheim process, such as complete immunity against incrustation, sludge and corrosion, are secured in this tubular plant.

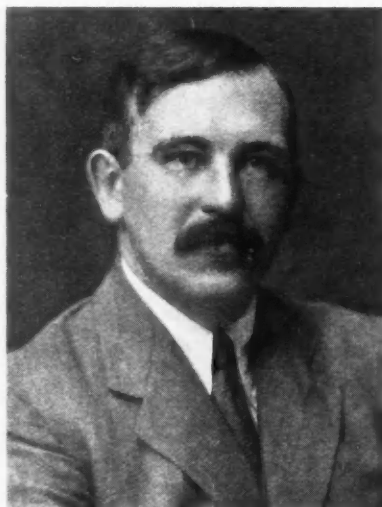
The British patent rights of the Budenheim process are owned by Phosphates, Ltd. The process has been in use on the Continent both for low and high pressure boilers, in particular such sensitive types as La Mont boilers.

A PLANT-GROWTH PROMOTING HORMONE has been synthesised by the I.G. Farbenindustrie, who are marketing it under the name of Belvitan.

## Personal Notes

MR. G. DRING, B.Sc., F.I.C., development manager of Bakelite Ltd., is attending the annual meeting of the Society of Chemical Industry to be held at Ottawa, June 17 to July 1. Mr. Dring will be present at the meeting in his capacity as chairman of the Birmingham and Midland branch of the S.C.I.

PROFESSOR R. H. FOWLER, O.B.E., M.A., F.R.S., at present Plummer professor of applied mathematics in the University of Cambridge, has been appointed Director of the National



Elliott and Fry

Physical Laboratory with effect as from October 1, 1938. Professor Fowler will succeed Dr. W. H. Bragg, who has been elected to the Cavendish professorship of experimental physics in the University of Cambridge.

MR. WILLIAM DIAMOND has retired after 32 years as manager of the Marley Hill Chemical Works, under J. Bowes and Partners.

MR. EDWARD PICKETT, of Windlehurst, Grove Road, Ilkley, senior partner in Edward Pickett and Co., glass merchants and manufacturers, of Hunslet, Leeds, died on August 14, left estate valued at £17,815 (net personalty £14,427).

SIR DAVID MILNE-WATSON, Bart., D.L., M.A., LL.D., Hon. M.Inst.Gas E., chairman of The British Gas Federation, governor of The Gas Light and Coke Company, was presented with the Birmingham Medal, 1938, at the 75th annual general meeting of the Institution of Gas Engineers. This medal, which is bestowed for originality in connection with the manufacture and application of gas, was awarded to Sir David Milne-Watson in recognition of the invaluable assistance rendered by him to the research work of the Institution of Gas Engineers and of the gas industry in general.

## OBITUARY

DR. T. BAKER, head of the research department and chief metallurgist at the Steel, Peech and Tozer works of the United Steel Companies, Ltd., died at Rotherham last week, aged 61. He was a fellow of the Institute of Chemistry, the Institute of Physics, a member of the Iron and Steel Institute, and the Institute of Metals, and of the Faraday Society.

DR. J. W. MELLOR, C.B.E., D.Sc., F.R.S., the distinguished scientist and ceramic physicist, and well known for his work in England, on the Continent, and in America, died at his home in Putney on Tuesday. For a considerable period he was director of the British Refractories Research Association, and when he retired in 1937 the association presented him with a cheque and a gift of books in recognition of his work for the ceramic industry in general and he refractories branch in particular.

## Ten Years Back

From "The Chemical Age," June 2, 1928

A new factory for production of synthetic nitrogen compounds is to be erected in Limburg, Holland. This state will take all, or nearly all, the material produced.

\* \* \* \*

The English rights of a German process for making metal immune against chemical action have been secured by the Power Gas Corporation Co., of Stockton, an associated company of I.C.I. A plant is being set up to work the patent and the Power Gas Corporation have in hand a number of contracts for plant for Synthetic Ammonia and Nitrates, Ltd.

\* \* \* \*

A considerable development in the manufacture of artificial fertilisers in France is announced in the report of the Etablissements Kuhlmann. The firm has now concluded agreements with several of the largest of the French collieries for the supply of their outputs of surplus coke oven gas. This is to be converted into synthetic nitrogen compounds using the Casale process.

\* \* \* \*

On May 25, the inquiry into the application for the inclusion of calcium biphosphate of baking powder quality in the Board of Trade list of articles chargeable with duty under the Safeguarding of Industries Act (Part I), came to an end. The chairman said that the committee had come to the decision that calcium biphosphate of baking powder quality was a fine chemical, and should be included in the list of the Board of Trade.

## Foreign Chemical Notes

### Hungary

PRODUCTION OF AMMONIUM CHLORIDE and sodium sulphate has been commenced by the firm of K. Benko.

### Germany

WILLOW BARK FIBRE made by a new process developed in Vienna can be used in place of jute as a sacking material.

CATHODIC REDUCTION OF LACTIC ACID, according to E. Baur, yields a mixture of ethyl alcohol and formic acid in stoichiometric proportions (*Z. Elektrochem.*, 43, 821).

### Japan

IMPROVEMENTS IN THE YIELD of soya bean oil when using the alcohol extraction process are reported by operating in presence of certain salts (sodium chloride, sodium acetate, calcium chloride) and soaps. In the case of calcium chloride the effect is due to an increase in the solubility of the oil in alcohol and in that of soaps to a reduction in the interfacial tension between oil and alcohol (Igavasi and Isida, *J. Soc. Chem. Ind. Japan*, 40, 271 B).

THE LIVER OILS OF FISH living at exceptionally great depths (about half-a-mile) have been examined by Tsujimoto and Koyanagi. With a weight of 85 to 250 grams, the livers give a 32 to 53 per cent. yield of oil with an iodine value of 113 to 169 and an unsaponifiable content of 0.45 to 4.6 per cent. (chiefly cholesterol). Palmitic acid is conspicuous by a relatively low percentage, most of the fatty acids consisting of the  $C_{18}$ ,  $C_{20}$ ,  $C_{22}$  and  $C_{24}$  group.

## From Week to Week

WORLD PRODUCTION OF TIN in the first quarter of 1938 was 43,200 tons, against 46,300 tons in the corresponding period last year, according to the May bulletin of the International Tin Research and Development Council.

THE LABORATORY STAFF of James Williamson and Son, Ltd., linoleum manufacturers, Lancaster, accompanied by Mr. T. McQuillen, chief chemist, this week travelled by motor coach to Keswick for their annual excursion.

PARKINSON'S, LTD., manufacturers of pills, powders and tablets, Burnley, have just celebrated the 90th anniversary of their establishment. They were the first firm in the world to coat pills with sugar. The founder's grandson, Mr. S. Herbert Parkinson, is the present governing director.

THE CONTRACT FOR THE SUPPLY OF THE CHEMICAL FIRE EXTINGUISHERS for the Empire Exhibition at Bellahouston Park, Glasgow, was placed with Minimax, Ltd., of Feltham, Middlesex. More than 2,000 appliances (soda acid foam and C.T.C.) were required to equip the buildings throughout the Exhibition and the amusement park.

THE INSTITUTION OF PETROLEUM TECHNOLOGISTS is holding an international conference from June 6 to 10, at the Empire Exhibition, Glasgow. Visits have been arranged to the Scottish shale fields and the Royal Technical College, Glasgow. Over 40 papers will be read and the question of oil from shale and canal will be discussed.

VICTOR BLADEN AND CO., LTD., Plantation House, Mining Lane, London, E.C.3, have acquired a larger riverside site at Barking, known as Gascoigne wharf. Building operations in connection with the drum, wharfage and chemical manufacturing business are now well advanced and when complete the firm will vacate their smaller premises at Abbey Road, Barking.

DORMAN LONG AND CO., LTD., last week-end issued notices to 350 employees at the Cleveland works following the firm's decision to close four furnaces. The four furnaces are old units which have been in operation to meet the exceptional demands of the last 18 months. The two small coke oven plants at the Redcar Works and Chilton Colliery are also being closed.

FIVE HUNDRED EMPLOYEES OF MACFIE AND SONS, LTD., whose sugar refinery in Liverpool closed down on Saturday after a century's existence, will receive £250,000 either as compensation or in the form of pensions. United Molasses Co., Ltd., recently purchased the refinery, and the business is to be transferred to the refinery of Tate and Lyle in Love Lane, Liverpool, which is owned by United Molasses. A large proportion of the displaced employees have, it is understood, already obtained other posts.

JARROW-ON-TYNE WITNESSED LAST FRIDAY, the official opening of its first new industries since the steel works and shipyard were closed down. These new enterprises are modern works for the making of all kinds of steel tubes and metal smelting works for the production of high-grade metals and castings. Their establishment has been in the main due to the efforts of Sir John Jarvis, M.P., who decided four years ago to take up the case of Jarrow then heavily hit by the depression. The works which are run in conjunction with pneumatic tool works and a foundry at Gateshead are employing about 1,500 men.

THE COMMERCIAL MOTOR USERS' ASSOCIATION has been in communication with the Ministry of Transport in relation to the announcement by the Minister in the House of Commons on February 16 last, when, in reply to a question asking him whether he proposed to avail himself of the powers given to him by the Road Traffic Act, 1937, to extend the period of currency of carriers' licences, he stated that he had accepted the recommendation of the Transport Advisory Council in relation to increasing the periods for "A," "B," and "C" licences, and would make the necessary regulations with as little delay as possible. The Association has asked the Minister whether he would be good enough to issue the draft regulations in the near future in order that the organisations concerned may have the opportunity of considering their provisions.

TWENTY-FOUR REPRESENTATIVES OF LOCAL AUTHORITIES and other organisations co-operating with the Department of Scientific and Industrial Research in investigations into the nature and extent of atmospheric pollution met in half-yearly conference recently. The conference, which has now been meeting regularly for ten years, noted that during this period there had been a marked increase in the number of places at which observations of deposited and of suspended matter were being regularly made by co-operating bodies. In addition a continually growing number of regular observations were now being made of sulphur gases in the atmosphere by methods which had since been introduced. Strong belief was expressed in the importance of continuing and extending the investigation in order to provide the assured basis of fact necessary for determining the nature of remedial measures desirable and for estimating their effect, when introduced.

A PROTEST AGAINST THE AUSTRALIAN EMBARGO on the export of iron ore announced on May 19, has been made by the Japanese Consul at Sydney, to the Australian Government. Iron ores, together with raw wool and flour, form the major part of Japan's imports from Australia.

CHELMSFORD TOWN COUNCIL are to install a chlorine pump and chlorograph recorder at their waterworks, and have accepted a revised tender for the supplying and fixing of these by the Paterson Engineering Co., at £300. Alterations will be made to the chemist's house to provide additional laboratory accommodation.

NEWTON, CHAMBERS AND CO., LTD., have issued a special set of leaflets dealing with various aspects of the pest-extermination problem. They are intended, in the main, for issue to public health and housing officials and others directly concerned with the disinfection of verminous premises, but contain a good deal of information of general interest.

THE INSTITUTION OF CIVIL ENGINEERS, with the approval and collaboration of the Air Raid Precautions Department, have appointed a committee for the compilation and publication of authoritative technical information on the subject of precautions against air attack for the use of engineers in their work of design, construction and maintenance of structures and other engineering work.

THE SECRETARY FOR MINES ANNOUNCES that three additional prospecting licences, covering a total area of approximately 395 square miles in Yorkshire, Cheshire, Staffordshire, Fife-shire, Blackmaunshire, Kinross-shire, and Perthshire, have been issued by the Board of Trade under the Petroleum (Production) Act, 1934, and the Petroleum (Production) Regulations, 1935, to the D'Arcy Exploration Co., Ltd.

IN THE COURSE OF A CASE AT PENZANCE, on May 23, in which a multiple firm of chemists were fined five guineas, with three guineas costs, for having sold strychnine powder contrary to the new poisons regulations, the prosecuting solicitor remarked that it had been set up by farmers that prohibition of the sale of strychnine hindered farming, because they could not destroy vermin without it. He added, however, that was not the case, as efficient substitutes were available.

THE COPPER DEVELOPMENT ASSOCIATION have just issued a new publication entitled "Copper Pipe Line Services in Building." It is a comprehensive practical handbook, giving complete information on all matters relating to the design and installation of copper pipe line services in buildings. Much of the information is of a strictly practical nature intended for those engaged in the actual installation of copper pipe line services. Chapters are included for the assistance of those concerned with the lay-out of such installations.

THE F. J. STOKES MACHINE CO., of Philadelphia, Pa., U.S.A., announce the appointment of Apex Construction, Ltd., chemical and pharmaceutical engineers, Swan House, 133-135 Oxford Street, London, W.1, as their British representatives for the sale of the Stokes line of tablet-making and pharmaceutical equipment, and tube jar and powder fillers. Mr. William C. Peck, M.Sc., M.I.Chem.E., A.I.C., managing director of Apex Construction, Ltd., will personally direct the sale of the Stokes line. He was for many years works manager and subsequently director of a large firm of manufacturing chemists and is fully conversant with all problems involved in the selection and proper use of equipment.

## Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

**British India.**—A well-established firm of agents at Bombay wishes to obtain the representation, on a commission or consignment basis, of United Kingdom manufacturers of chemicals, drugs, pharmaceutical products for India or the Bombay and Madras Presidencies, including Sind. (Ref. No. 374.)

## Books Received

- Copper Pipe-Line Services in Building.** London: Copper Development Association. Pp. 116.  
**Gas Analysis.** By A. McCulloch. London: H. F. and G. Witherby, Ltd. Pp. 159. 7s. 6d.  
**Kelly's Directory of Merchants, Manufacturers and Shippers of the World.** Vol. 1 and 2. Pp. 1,904 and 1,844. 64s.  
**Modern Aspects of Inorganic Chemistry.** By H. J. Emeleus and J. S. Anderson. London: George Routledge and Sons, Ltd. Pp. 536. 25s.

## Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

### Applications for Patents

PRODUCTION OF HYDROGEN PEROXIDE.—G. Adolph and M. E. Bretschger. (United States, May 14, '37.) 13962.  
 DETERGENTS.—Alframine Corporation. (United States, Oct. 15, '37.) 13867; (United States, March 1.) 13868.  
 PROCESS FOR WASHING GASES OR VAPOURS OUT OF CRUDE GASES.—Bamag-Meguini, A.-G. (Germany, March 31.) 13830.  
 PROCESSING OF CALCINED PIGMENTS.—Bird Machine Co. (United States, May 10, '37.) 13951.  
 PROCESS FOR SEPARATING THE RESIDUES OF COKE-FIRED GAS-RETORTS, ETC.—British Geco Engineering Co., Ltd., J. M. Callow, and A. W. Jones. 13501.  
 PROCESS FOR DRYING, ETC., ADSORBENTS.—Carbo-Norit-Union Verwaltungs-Ges. (Germany, July 15, '37.) 14107.  
 CARBON DIOXIDE CONTAINERS.—Carbon Dioxide Co., Ltd., and C. E. Paul. 13473.  
 METHODS OF ADHESION.—A. Carpmal (I. G. Farbenindustrie.) 13705.  
 MANUFACTURE OF COMPOUNDS OF THE DIARYL-SERIES.—A. Carpmal (I. G. Farbenindustrie.) 13823.  
 MANUFACTURE OF POLYMERIC VINYL ALCOHOLS, ETC.—Chemische Forschungsges. (Germany, May 10, '37.) 13798.  
 PROCESS FOR THE PRODUCTION OF ETHERS.—Consortium für Elektrochemische Industrie Ges. (Germany, May 7, '37.) 13657.  
 RENDERING OF IRON, ETC., ARTICLES RICH IN CHROMIUM.—K. Daeves, and G. Becker. (Germany, May 5, '37.) 13477.  
 PRODUCTION OF SURFACE LAYERS OF HIGH CHROMIUM CONTENTS ON ARTICLES MADE FROM IRON ALLOYS.—K. Daeves, and G. Becker. (Germany, May 11, '37.) 13629.  
 MANUFACTURE OF MERCAPTALS AND MERCAPTOLS.—Deutsche Hydrierwerke, A.-G. (Germany, May 7, '37.) 13816.  
 MANUFACTURE OF LUBRICANTS, ETC.—E. I. du Pont de Nemours and Co. (United States, May 6, '37.) 13630.  
 ADDITION PRODUCTS OF THIOPHENOLS, ETC.—E. I. du Pont de Nemours and Co. 13974.  
 MANUFACTURE OF POLYCARBOXYLIC ACID ESTERS OF ALKYNYL CARBINOLS.—E. I. du Pont de Nemours and Co. 14115.  
 DEVICES FOR THE PURIFICATION OF POISONOUS GASES, ETC.—A. Fernex. (France, May 5, '37.) 13507.  
 PROCESS FOR THE MANUFACTURE OF PHOTOGRAPHIC COLLOIDS.—B. Gaspar. 14068.  
 MANUFACTURE OF VAT-DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) 13421.  
 MANUFACTURE OF 2-MERCAPTOBENZIMIDAZOLE ARSINE OXIDES.—W. W. Groves (I. G. Farbenindustrie.) 13566.  
 MANUFACTURE OF TRIARYLMETHANE DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) 13567.  
 MANUFACTURE OF SOFTENING AGENTS.—W. W. Groves (I. G. Farbenindustrie.) 13794.  
 MANUFACTURE OF SPLINTERLESS GLASS.—W. W. Groves (I. G. Farbenindustrie.) 13795.  
 MANUFACTURE OF TRIARYLMETHANE DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) 13796.  
 MANUFACTURE OF PACKING-MATERIAL.—W. W. Groves (I. G. Farbenindustrie.) 13797.  
 MANUFACTURE OF COPPER SULPHATE.—E. Hayward. 13831.  
 HYDROGENATION OF ORGANIC SUBSTANCES.—A. G. Hellicar, A. W. C. Taylor, and Imperial Chemical Industries, Ltd. 14116.  
 PRODUCTION OF HEAVY METAL OXIDES.—V. Himmelbauer. 13585.  
 MANUFACTURE, ETC., OF AZO DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 13606.  
 TREATMENT OF POTASH COMPOUNDS.—A. Kelly. 13933.  
 PROCESS FOR THE THERMAL DECOMPOSITION OF METAL SALTS.—Metallges, A.-G., and K. Ebner. 13829.  
 PROCESS FOR THE REMOVAL OF MERCAPTANS FROM HYDROCARBON DISTILLATES.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (United States, May 26, '37.) 13833.  
 METHOD OF FACILITATING PHYSICAL, ETC., REACTION BETWEEN GASES, ETC.—J. E. Nyrop. (Denmark, May 7, '37.) 13782.  
 MANUFACTURE OF CYCLIC KETONES.—R. Robinson. 13476.  
 MANUFACTURE OF OIL-SOLUBLE RESIN, ETC.—I. Rosenblum. (United States, March 2.) 13596.  
 PROCESS FOR DECHLORINATING HYDROCARBONS.—Ruhrchemie, A.-G. (Germany, June 10, '37.) 13862.  
 MANUFACTURE OF HYDROGENATED INDANE-DIONES.—Schering, A.-G. (Germany, May 10, '37.) 13965.  
 MANUFACTURE OF OESTROGENIC COMPOUNDS.—Schering, A.-G. (Germany, May 11, '37.) 14080.  
 PREPARATION OF P-ISOPROPYL-A-METHYL-HYDROCINNAMIC ALDEHYDE.—Soc. des Usines Chimiques Rhône-Poulenc. (France, June 29, '37.) 13602.  
 MANUFACTURE OF RUBBER THREADS.—Soc. Internationale de Participations Industrielles et Commerciales Soc. Anon. (United States, June 2, '37.) 13610.  
 LOW-TEMPERATURE CARBONISATION FURNACES.—J. G. Seoular. 13885.

OPAQUE VITREOUS ENAMELS.—Soc. de Produits des Terres Rares, and M. Paquet. 13494.  
 MANUFACTURE OF COMPOUNDS OF THE AETIOCHOLANIC ACID SERIES.—Soc. of Chemical Industry in Basle. (Switzerland, May 5, '37.) 13422; (Switzerland, April 14.) 13423.  
 MANUFACTURE OF IMIDAZOLINES SUBSTITUTED IN 2-POSITION.—Soc. of Chemical Industry in Basle. (Switzerland, May 7, '37.) 13424; (Switzerland, April 12.) 13425.  
 MANUFACTURE OF DYESTUFFS OF THE ANTHRAQUINONE SERIES.—Soc. of Chemical Industry in Basle. (Switzerland, May 11, '37.) 14064.  
 FURNACE FOR DISTILLATION OF HYDROCARBON MATERIAL.—Soc. pour l'Exploitation des Procédés Ab-Der-Halden. France, June 21, '37.) 13403.  
 TIN ALLOY.—A. A. Thornton (Cleveland Graphite Bronze Co.). 13418.  
 TREATMENT OF RUBBER.—United States Rubber Products, Inc. (United States, May 8, '37.) 13757.  
 RUBBER COMPOSITIONS.—United States Rubber Products, Inc. (United States, May 15, '37.) 14098.  
 PRODUCTION OF OLEFIN OXIDES.—United States Industrial Alcohol Co. (United States, May 8, '37.) 13755.  
 MANUFACTURE OF COMPOUNDS OF THE CYCLOPENTANO-POLYHYDROPHENANTHRENE SERIES.—W. P. Williams (Schering, A.-G.) (May 6, '37.) 13500.  
 PRODUCTION OF MAGNETIC IRON OXIDE.—A. Aide, Ltd., and H. E. Coley. 14826.  
 MANUFACTURE OF ARTIFICIAL RESINS.—Albert Products, Ltd. (Germany, June 18, '37.) 14720.  
 PRODUCTION OF RAYON YARN.—American Viscose Corporation. (United States, July 22, '37.) 14389.  
 RECOVERY OF VALUABLE IMPURITIES FROM ZINC CONCENTRATES.—American Zinc, Lead and Smelting Co. (United States, June 1, '37.) 14734; (United States, June 26, '37.) 14735.  
 MANUFACTURE, ETC., OF SYNTHETIC RUBBER-LIKE MATERIALS.—J. G. Anderson, R. Hill, L. B. Morgan, and Imperial Chemical Industries, Ltd. 14874.  
 PREPARATION OF INSECTICIDES, ETC.—P. Bary, and C. Cornu. (Luxembourg, Dec. 17, '37.) 14288.  
 MANUFACTURE OF GLUE, ETC.—British Glues and Chemicals, Ltd., and R. B. Drew. 14685.  
 MANUFACTURE OF BASIC STEEL.—J. B. R. Brooke. 14857.  
 DETERGENT COMPOSITIONS.—Colgate-Palmolive-Peet Co. (United States, November 30, '37.) 14843; (United States, June 10, '37.) 14854.  
 ELECTROLYTIC REFINING OF ALUMINIUM.—Compagnie de Produits Chimiques et Electrometallurgiques Alais, Fröges, et Camargue. (France, May 14, '37.) 14317.  
 MANUFACTURE OF FERROUS ALLOYS.—F. C. T. Daniels. (United States, April 8.) 14576.  
 MANUFACTURE OF ARALKYLAMINOPHENOLS.—E. I. du Pont de Nemours and Co., C. O. Henke and R. G. Benner. 14589.  
 MANUFACTURE OF DISAZO DYESTUFFS.—J. R. Geigy, A.-G. (Switzerland, May 19, '37.) 14699.  
 METHOD OF PREPARING WATER-SOLUBLE DERIVATIVES OF THE INDOLINE SERIES.—J. R. Geigy, A.-G. (Switzerland, May 19, '37.) 14700.

### Specifications Open to Public Inspection

HYDROGENATION OF ORGANIC MATERIALS.—Wingfoot Corporation. Nov. 21, 1936. 18051/37.  
 MANUFACTURE OF CARBONTETRACHLORIDE AND A FURNACE FOR USE THEREIN.—I. G. Farbenindustrie. Nov. 19, 1936. 25818/37.  
 MANUFACTURE OF STEEL.—Kohle-Und Eisenforschung Ges. Nov. 19, 1936. 27460/37.  
 MANUFACTURE OF POLYMERISED VINYL COMPOUNDS.—I. G. Farbenindustrie. Nov. 20, 1936. 27856/37.  
 RECOVERY OF ALUMINIUM AND FLUORINE COMPOUND FROM THE WORN-OUT LININGS OF THE ELECTRIC FURNACES EMPLOYED FOR THE PRODUCTION OF ALUMINIUM.—Rutgerswerke, A.-G. Nov. 17, 1936. 28768/37.  
 MANUFACTURE OF COMPOUNDS OF THE TYPE OF OESTRADIOL ESTERIFIED IN 3-POSITION.—Soc. of Chemical Industry in Basle. Nov. 20, 1936. 30081/37.  
 MANUFACTURE OF PARTIALLY ESTERIFIED COMPOUNDS OF THE DIHYDROOESTRIN SERIES.—Soc. of Chemical Industry in Basle. Nov. 20, 1936. 30085/37.  
 CONVERSION OF HYDROCARBON OILS INTO MOTOR FUELS BY TREATMENT AT ELEVATED TEMPERATURES.—Houdry Process Corporation. Nov. 20, 1936. 30727/37.  
 PRODUCTION OF LIQUID POLYMERS FROM HYDROCARBON GASES CONTAINING OLEFINS.—Houdry Process Corporation. Nov. 23, 1936. 30730/37.  
 PROCESS AND APPARATUS FOR THE SEPARATION OF WATER AND SALTS FROM STEAM.—Schmidt'sche Heissdampf-Ges. Nov. 19, 1936. 31298/37.

MOULDBLE COMPOSITIONS containing synthetic resins.—Bakelite, Ltd. Nov. 19, 1936. 31159/37.

ORGANIC COMPOUNDS and their application.—Celluloid Corporation. Nov. 19, 1936. 31328/37.

MANUFACTURE OF HIGH MOLECULAR WEIGHT halogenated organic compounds.—Standard Oil Development Co. Nov. 21, 1936. 31437/37.

MANUFACTURE OF ANHYDROUS ALUMINIUM SULPHATE.—Monsanto Chemical Co. Nov. 18, 1936. 31612/37.

MANUFACTURE OF AZO-DYESTUFFS.—Soc. of Chemical Industry in Basle. Nov. 19, 1936. 31873/37.

TREATMENT OF MATERIALS to render the same resistant to oil, grease, and hydrocarbons.—Atlas Powder Co. Nov. 21, 1936. 31882/37.

PRODUCTION OF CARBOCYANINE-LIKE DYESTUFFS and the sensitizing of photographic silver halide emulsions.—Gevaert Photo. Producten N.V. Nov. 23, 1936. 32293/37.

MANUFACTURE OF PRODUCTS COMPRISING DEXTROSE.—International Patents Development Co. Nov. 23, 1936. 32295/37.

### Specifications Accepted with Dates of Application

MANUFACTURE OF ACID WOOL DYESTUFFS of the anthraquinone series.—I. G. Farbenindustrie. Nov. 12, 1936. 484,655.

MANUFACTURE OF OPACIFIERS FOR VITREOUS ENAMELS.—J. C. Arnold (Harshaw Chemical Co.). Jan. 3, 1938. 484,562.

PREPARATION OF 2,4-DINITRO-6-CYCLOHEXYL PHENOL.—W. J. Tennant (Dow Chemical Co.). Feb. 14, 1938. 484,291.

MANUFACTURE OF CARBO-CYCLOC BASIC PRODUCTS.—W. W. Groves (I. G. Farbenindustrie.) Oct. 7, 1936. 484,906.

MANUFACTURE OF ACID AMIDES.—W. J. Tennant (Henkel and Cie. Ges.). Nov. 9, 1936. 484,910.

CATALYTIC REDUCTION OF CARBOXYLIC ACIDS.—G. W. Johnson (I. G. Farbenindustrie.) Nov. 10, 1936. 484,995.

ALUMINIUM ALLOY for use in the wrought condition.—H. C. Hall. Nov. 10, 1936. 485,091.

MANUFACTURE OF RED LEAD.—A. Wreschner. Nov. 10, 1936. 484,809.

PROCESS FOR THE MANUFACTURE OF CALCIUM HYDRIDE.—Ventures, Ltd. Nov. 19, 1936. 485,163.

MANUFACTURE OF AMMONIUM SULPHATE.—M. P. Applebey, and Imperial Chemical Industries, Ltd. Nov. 11, 1936. 485,164.

MANUFACTURE OF AMMONIUM SULPHATE.—J. W. R. Rayner, and Imperial Chemical Industries, Ltd. Nov. 11, 1936. 484,921.

MANUFACTURE OF LUBRICATING OILS.—A. P. Lowes, D. E. White, and Imperial Chemical Industries, Ltd. Nov. 11, 1936. 485,165.

MANUFACTURE AND PRODUCTION OF COMPOUNDS of the anthraquinone series.—G. W. Johnson (I. G. Farbenindustrie.) Nov. 13, 1936. 485,175.

RECOVERING SULPHUR DIOXIDE from waste gases.—University of Illinois, Board of Trustees of the. Dec. 28, 1935. 484,714.

MANUFACTURE OF ALKALI METALS and alkali metal hydroxides.—T. Wood. Nov. 12, 1936. 484,997.

MOULDED MASSES from polyvinyl chloride.—W. W. Groves (I. G. Farbenindustrie.) Nov. 12, 1936. 485,000.

PRODUCTION OF CATALYSTS, more particularly for the dehydrogenation of hydrocarbons.—Standard Oil Development Co. Dec. 31, 1935. 485,178.

MANUFACTURE OF VOLTOLISED PRODUCTS from mineral oils.—J. C. Arnold (Standard Development Co.). Nov. 13, 1936. (Convention date not granted.) 485,105.

MANUFACTURE OF ESTERS.—H. Dreyfus. Nov. 14, 1936. 485,108.

MANUFACTURE OF POLYVINYL CHLORIDE POLYMERISATES.—W. W. Groves (I. G. Farbenindustrie.) Nov. 16, 1936. 485,115.

MANUFACTURE OF DISAZO-DYESTUFFS insoluble in water.—W. W. Groves (I. G. Farbenindustrie.) Nov. 16, 1936. 485,116.

PRODUCTION OF TANTALUM and/or niobium carbides.—W. W. Triggs (Soc. Generale Metallurgique de Hoboken). Dec. 12, 1936. 485,021.

PURIFICATION OF SOYA BEAN OIL.—Kodak, Ltd. (Eastman Kodak Co.). Dec. 24, 1936. 484,736.

HIGH TENSILE ALLOY STEEL.—W. H. Hatfield, and J. F. Bridge. Feb. 5, 1937. 484,835.

MANUFACTURE OF ETHYLENE OXIDE.—Distillers Co., Ltd., H. Langwell, and H. M. Stanley. Feb. 17, 1937. 485,033.

PRODUCING BUTYL ALCOHOL AND ACETONE.—A. Frey, H. Gluck, and Chemische Fabrik Kalk Ges. March 16, 1936. 484,847.

CONCENTRATING LOW-GRADE IRON ORES.—Metallges. A.-G. June 13, 1936. 484,757.

MANUFACTURE OF DEHYDROGENATION PRODUCTS from heterocyclic bases and application thereof.—Soc. of Chemical Industry in Basle. June 20, 1936. 484,862.

MANUFACTURE OF ALLOYS for permanent magnets.—British Thomson-Houston Co., Ltd. Aug. 19, 1936. 485,074.

REFINING OF PIG-IRON and the production of steel or alloy steels.—A. C. Nesfield. Sept. 6, 1937. 484,958.

SYNTHETIC RESINOUS PRODUCTS and process for making the same.—Atlas Powder Co. Oct. 1, 1936. 484,959.

REGENERATING CATALYSTS FOR BENZINE SYNTHESIS.—Ruhrchemie, A.-G. Sept. 22, 1936. 484,962.

MANUFACTURE OF ALCOHOLS and ethers.—H. Dreyfus. Nov. 14, 1936. 485,142.

CONCENTRATING AQUEOUS HALOHYDRIN SOLUTIONS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Nov. 17, 1936. 484,884.

PRODUCTION OF CARBON TETRACHLORIDE.—W. J. Tennant (Dow Chemical Co.). Nov. 23, 1937. 484,888.

## Chemical and Allied Stocks and Shares

GENERAL conditions in the industrial and other departments of the Stock Exchange have again shown a reactionary trend this week. The volume of business has been further reduced by holiday influences, and despite the apparently generous yields now obtainable on leading industrial securities, the tendency in the market is for buyers to continue to await further indications as to the trade outlook and near term developments in European political affairs.

As was to be expected, the general trend of markets has been the main influence affecting shares of companies associated with the chemical and kindred industries. Imperial Chemical were a relatively steady feature and at 29s. are within 7½d. of the price current a week ago. At this price the yield on the basis of last year's 8½ per cent. dividend is nearly 6 per cent., and the general assumption in the market is that there seem reasonable prospects of the dividend being maintained at around 8 per cent. Distillers at 95s. lost part of their good rise of the previous week, but hopes of a moderately larger distribution for the year ended last month have remained current. General Refractories at 13s. have made a better price under the influence of the statements at the recent meeting.

Boots Pure Drug were relatively steady, and at 39s. 7½d. are virtually unchanged on balance, the disposition being to await the meeting on June 16, as the chairman's speech is awaited in the market with more than usual interest because it is possible some indication may be given as to whether it is the intention to distribute a scrip bonus in the more immediate future. Turner and Newall at 78s. 1½d. have again been moderately reactionary on the belief that the interim dividend will be unchanged and all question of an increase left until the final payment for the year. The assumption in the market is that the company is continuing to do well because demand for asbestos for armament and allied purposes may be more than offsetting any decline in other directions.

British Plaster Board at 27s. have been fairly well maintained, aided by hopes that the past year's dividend on these 5s. shares may again be brought up to 50 per cent. Associated Portland Cement were lower at 78s. 1½d. Barry and Staines at 38s. have

lost their improvement of the previous week, while Michael Nairn have moved down 1s. 3d. to 58s. 9d., but, as in most other directions, the lower prices made this week were not attributed to less hopeful views in regard to dividend prospects, but to the surrounding trend in Stock Exchange markets. Wall Paper deferred at 36s. are within 6d. of the price recorded here a week ago.

British Oxygen moved down to 65s. 7½d. It is believed in the market that details of the company's expected issue of preference shares will be announced later in the month. Murex were dull and Fison Packard and Prentice have lost 7½d. to 33s. 9d. at the time of writing, although the fact that the interim dividend has been maintained has increased anticipations that there are reasonable prospects of the total for the year being at least repeated at 9 per cent. Some market men are budgeting for 10 per cent. as it is assumed that earning power is now benefiting much more fully from the expansion of the business.

Timothy Whites and Taylors have moved down 9d. to 25s. 9d. and British Drug Houses to 22s. 6d., at which the shares of both companies would appear to give quite generous yields on the basis of last year's dividends. Reckitt and Sons' ordinary shares and Cerebos ordinary were again firm at £5½ and £8½ respectively. Lever Bros. at 36s. 9d. are also the same as a week ago, but British Match are lower at 31s. 9d. at the time of writing. Pinchin Johnson at 28s. 6d. have been fairly well maintained, and most other shares of paint manufacturers were only moderately lower on the week.

Iron, steel and kindred securities have failed to develop a better tendency. Hadfields and shares of other companies with important rearmament activities were the most active in this section, although hopes of a larger dividend continued to attract a fair amount of attention to Consett Iron. Stanton Iron's shares were firm on the bonus.

Oil shares attracted more attention under the influence of the Anglo-Iranian distribution of 25 per cent. for the past year. The latter, which is payable on enlarged capital owing to last year's scrip bonus, exceeded market anticipations.

## Weekly Prices of British Chemical Products

**S**TEADY conditions have prevailed in the chemical markets during the past week and traders report a slight expansion in the volume of spot business. A little more attention has also been given to fresh long term buying owing to the fact that a number of existing contract commitments are nearing completion. Values on the whole have been well held and there are no important changes in quotations for general chemicals, rubber chemicals and wood distillation products, and the general tone is reported good. Conditions in the coal tar section show no improvement on the week and there has been no substantial buying in progress. Quotations are normal.

**MANCHESTER.**—There has been little or no improvement in the demand for textile bleaching and dyeing chemicals on the Manchester market during the past week and contract deliveries

to this important using branch in Lancashire and West Yorkshire are reported to be no more than moderate. In most other directions, however, there is a fair flow of delivery specifications. New business this week has been on quiet lines and the position in this respect has not been improved by the approach of the Whitsun holidays. The by-products market has been slow generally and here and there quotations have further moved in favour of buyers, cresylic and carbolic acids being prominent from this point of view.

**GLASGOW.**—There has been a slight improvement in the demand for chemicals for home trade since our last report, though export business remains very quiet. Prices general continue quite steady at about previous figures, though lead and copper products are rather easier, on account of the lower metal prices.

### Price Changes

**Falls:** Copper Sulphate (Manchester and Glasgow); Benzol, crude (Manchester); Carbolic Acid, crude 60's; dehydrated; crude (Manchester); Cresylic Acid, 97.99%; pale, 99/100%; pale, 99/100% (Manchester); Naphthalene, fire lighter quality; Calcium Acetate, brown and grey (Manchester).

### General Chemicals

**ACETONE.**—£45 to £47 per ton.

**ACETIC ACID.**—Tech., 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. **MANCHESTER:** 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

**ALUM.**—Loose lump, £8 7s. 6d. per ton d/d; **GLASGOW:** Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

**ALUMINIUM SULPHATE.**—£7 2s. 6d. per ton d/d **Lanes GLASGOW:** £7 to £8 ex store.

**AMMONIA, ANHYDROUS.**—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. **SCOTLAND:** 10½d. to 1s. 0½d., containers extra and returnable.

**AMMONIA, LIQUID.**—**SCOTLAND:** 80°, 2½d. to 3d. per lb., d/d.

**AMMONIUM CARBONATE.**—£20 per ton d/d in 5 cwt. casks.

**AMMONIUM CHLORIDE.**—Grey galvanising, £19 per ton, ex wharf.

**AMMONIUM CHLORIDE (MURIATE).**—**SCOTLAND:** British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salamoniac.)

**AMMONIUM DICHROMATE.**—8½d. per lb. d/d U.K.

**ANTIMONY OXIDE.**—£68 per ton.

**ARSENIC.**—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r. mines, according to quantity. **MANCHESTER:** White powdered Cornish, £16 10s. per ton, ex store.

**BARIUM CHLORIDE.**—£11 10s. to £12 10s. per ton in casks ex store. **GLASGOW:** £11 10s. per ton.

**BLEACHING POWDER.**—Spot, 35/37%, £9 5s. per ton in casks, special terms for contracts. **SCOTLAND:** £9 per ton net ex store.

**BORAX COMMERCIAL.**—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. **GLASGOW:** Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

**BORIC ACID.**—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. **GLASGOW:** Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

**CALCIUM BISULPHITE.**—£6 10s. per ton f.o.r. London.

**CHARCOAL, LUMP.**—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

**CHLORINE, LIQUID.**—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 3½d. per lb. d/d station in 70-lb. cylinders (1-ton lots).

**CHROMETAN.**—Crystals, 2½d. per lb.; liquor, £13 per ton d/d station in drums. **GLASGOW:** 70/75% solid, £5 15s. per ton net ex store.

**CHROMIC ACID.**—10d. per lb., less 2½%; d/d U.K.

**CHROMIUM OXIDE.**—11d. per lb.; d/d U.K.

**CITRIC ACID.**—1s. 0½d. per lb. **MANCHESTER:** 1s. 0½d. **SCOTLAND:** B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

**COPPER SULPHATE.**—£21 7s. 6d. per ton, less 2% in casks. **MANCHESTER:** £18 per ton f.o.b. **SCOTLAND:** £18 10s. per ton, less 5%, Liverpool, in casks.

**CREAM OF TARTAR.**—100%, 92s. per cwt., less 2½%. **GLASGOW:** 99%, £4 12s. per cwt. in 5-cwt. casks.

**FORMALDEHYDE.**—£20-£22 per ton.

**FORMIC ACID.**—85%, in carboys, ton lots, £42 to £47 per ton.

**GLYCERINE.**—Chemically pure, double distilled, 1.260 s.g., in tins, £4 2s. 6d. to £5 2s. 6d. per cwt. according to quantity; in drums, £3 15s. 0d. to £4 7s. 6d.

**HYDROCHLORIC ACID.**—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

**IODINE.**—Resublimed B.P., 6s. 4d. per lb. in 7 lb. lots.

**LACTIC ACID.**—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

**LEAD ACETATE.**—**LONDON:** White, £31 10s. ton lots; brown, £35 **GLASGOW:** White crystals, £30; brown, £1 per ton less. **MANCHESTER:** White, £32; brown, £31.

**LEAD, NITRATE.**—£72 per ton for 1-ton lots.

**LEAD, RED.**—£30 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. **SCOTLAND:** £31 per ton, less 2½% carriage paid for 2-ton lots.

**LITHARGE.**—**SCOTLAND:** Ground, £30 per ton, less 2½% carriage paid for 2-ton lots.

**MAGNESITE.**—**SCOTLAND:** Ground calcined, £9 per ton, ex store. **MAGNESIUM CHLORIDE.**—**SCOTLAND:** £7 10s. per ton.

**MAGNESIUM SULPHATE.**—Commercial, £5 10s. per ton, ex wharf.

**MERCURY.**—Ammoniated B.P. (white precip.), lump, 5s. 10d. per lb.; powder B.P., 6s. 0d.; bichloride B.P. (corros. sub.) 5s. 1d.; powder B.P. 4s. 9d.; chloride B.P. (calomel), 5s. 10d.; red oxide cryst. (red precip.), 6s. 11d.; levig. 6s. 5d.; yellow oxide B.P. 6s. 3d.; persulphate white B.P.C., 6s. 0d.; sulphide black (hyd. sulph. cum sulph. 50%), 5s. 11d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

**METHYLATED SPIRIT.**—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. **SCOTLAND:** Industrial 64 O.P., 1s. 9d. to 2s. 4d.

**NITRIC ACID.**—Spot, £25 to £30 per ton according to strength, quantity and destination.

**OXALIC ACID.**—£48 15s. to £57 10s. per ton, according to packages and position. **GLASGOW:** £2 9s. per cwt. in casks. **MANCHESTER:** £49 to £54 per ton ex store.

**PARAFFIN WAX.**—**SCOTLAND:** 3½d. per lb.

**POTASH CAUSTIC.**—Solid, £35 5s. to £40 per ton according to quantity, ex store; broken, £42 per ton. **MANCHESTER:** £38 10s.

**POTASSIUM CHLORATE.**—£36 7s. 6d. per ton. **GLASGOW:** 4½d. per lb. **MANCHESTER:** £37 10s. per ton.

**POTASSIUM DICHROMATE.**—5½d. per lb. carriage paid. **SCOTLAND:** 5½d. per lb., net, carriage paid.

**POTASSIUM IODIDE.**—B.P. 5s. 6d. per lb. in 7 lb. lots.

**POTASSIUM NITRATE.**—Small granular crystals, £24 to £27 per ton ex store, according to quantity. **GLASGOW:** Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

**POTASSIUM PERMANGANATE.**—**LONDON:** 9½d. per lb. **SCOTLAND:** B.P. Crystals, 9½d. **MANCHESTER:** B.P. 10½d. to 1s.

**POTASSIUM PRUSSIAN.**—6½d. per lb. **SCOTLAND:** 7d. net, in casks, ex store. **MANCHESTER:** Yellow, 6½d. to 6½d.

**PRUSSIAN OF POTASH CRYSTALS.**—In casks, 6½d. per lb. net, ex store.

**SALAMONIAIC.**—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dogtooth crystals, £36 per ton; fine white crystals, £18 per ton, in casks, ex store. **GLASGOW:** Large crystals, in casks, £37 10s.

**SALT CAKE.**—Unground, spot, £3 11s. per ton.

**SODA ASH.**—58% spot, £5 17s. 6d. per ton f.o.r. in bags.

**SODA, CAUSTIC.**—Solid, 76/77° spot, 13s. 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £8 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

**SODA CRYSTALS.**—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

**SODIUM ACETATE.**—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

**SODIUM BICARBONATE.**—Refined spot, £10 15s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 10s.

**SODIUM BISULPHITE POWDER.**—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

**SODIUM CARBONATE MONOHYDRATE.**—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

**SODIUM CHLORATE.**—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.

**SODIUM DICHROMATE.**—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts. MANCHESTER: SODIUM CHROMATE.—4½d. per lb. d/d U.K.

**SODIUM GLASS.**—4½d. net, carriage paid.

**SODIUM HYPOSULPHITE.**—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.

**SODIUM METASILICATE.**—£14 5s. per ton, d/d U.K. in cwt. bags.

**SODIUM NITRATE.**—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s. 0d. per cwt. in 1-cwt. kegs, net, ex store.

**SODIUM NITRITE.**—£18 5s. per ton for ton lots.

**SODIUM PERBORATE.**—10%, 9½d. per lb. d/d in 1-cwt. drums.

**SODIUM PHOSPHATE.**—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £15 to £16 per ton delivered per ton lots.

**SODIUM PRUSSIAN.**—d. per lb. for ton lots. GLASGOW: 5d. to 5½d. ex store. MANCHESTER: 4½d. to 5½d.

**SODIUM SILICATE.**—£8 2s. 6d. per ton.

**SODIUM SULPHATE (GLAUBER SALTS).**—£3 per ton d/d.

**SODIUM SULPHATE (SALT CAKE).**—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 12s. 6d.

**SODIUM SULPHIDE.**—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.

**SODIUM SULPHITE.**—Pea crystals, spot, £14 10s. per ton d/d station in kegs.

**SULPHUR PRECIP.**—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

**SULPHURIC ACID.**—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

**TARTARIC ACID.**—Is. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: Is. 1½d. to Is. 1½d. per lb. GLASGOW: Is. 1d. per lb., 5%, ex store.

**ZINC SULPHATE.**—Tech., £11 10s. f.o.b., in 2 cwt. bags.

### Rubber Chemicals

**ANTIMONY SULPHIDE.**—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.

**ARSENIC SULPHIDE.**—Yellow, 1s. 5d. to 1s. 7d. per lb.

**BARYTE.**—£6 to £6 10s. per ton, according to quality.

**CADMIUM SULPHIDE.**—4s. 3d. to 4s. 6d. per lb.

**CARBON BLACK.**—3½d. to 3 15/16d. per lb., ex store.

**CARBON DISULPHIDE.**—£31 to £33 per ton, according to quantity, drums extra.

**CARBON TETRACHLORIDE.**—£41 to £46 per ton, according to quantity, drums extra.

**CHROMIUM OXIDE.**—Green, 10½d. to 11d. per lb.

**DIPHENYLGLYANDINE.**—2s. 2d. per lb.

**INDIA-RUBBER SUBSTITUTES.**—White, 4½d. to 5½d. per lb.; dark 3½d. to 4½d. per lb.

**LAMP BLACK.**—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.

**LEAD HYPOSULPHITE.**—9d. per lb.

**LITHOPONE.**—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.

**SULPHUR.**—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.

**SULPHUR CHLORIDE.**—5d. to 7d. per lb., according to quantity.

**VERMILION.**—Pale, or deep, 4s. 9d. per lb., 1-cwt. lots.

**ZINC SULPHIDE.**—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

### Nitrogen Fertilisers

**AMMONIUM SULPHATE.**—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938: November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.

**CALCIUM CYANAMIDE.**—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1938: November, £7 10s.; December, £7 11s. 3d.; January, 1938, £7 12s. 6d.; February, £7 13s. 9d.; March, £7 15s.; April/June, £7 16s. 3d.

**NITRO CHALK.**—£7 10s. 6d. per ton up to June 30, 1938

**SODIUM NITRATE.**—£8 per ton for delivery up to June 30, 1938.

**CONCENTRATED COMPLETE FERTILISERS.**—£11 4s. to £11 13s. per ton in 5-ton lots to farmer's nearest station.

**AMMONIUM PHOSPHATE FERTILISERS.**—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

### Coal Tar Products

**BENZOL.**—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. MANCHESTER: Pure, 1s. 7d. to 1s. 8d. per gal.; crude, 11d. to 1s. per gal.

**CARBOLIC ACID.**—Crystals, 7½d. to 8½d. per lb., small quantities would be dearer; Crude, 60's, 2s. 9d. to 3s.; dehydrated, 3s. to 3s. 3d. per gal. MANCHESTER: Crystals, 7½d. per lb. f.o.b. in drums; crude, 2s. 2d. to 2s. 5d. per gal.

**CREOSOTE.**—Home trade, 5½d. per gal., f.o.r. makers' works; exports, 6½d. to 6¾d. per gal., according to grade. MANCHESTER: 4½d. to 5½d. GLASGOW: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sp. 6s. oils, 5½d. to 6½d.

**CRESYLIC ACID.**—97/99%, 2s. to 2s. 3d.; 99/100%, 3s. 6d. to 5s. 6d. per gal., according to specification; Pale, 99/100%, 2s. 3d. to 2s. 6d.; Dark, 95%, 1s. 9d. to 2s. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. MANCHESTER: Pale, 99/100%, 2s. 9d.

**NAPHTHA.**—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1d. to 1s. 3d. per gal., naked at works, according to quantity. GLASGOW: Crude, 6½d. to 7½d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.

**NAPHTHALENE.**—Crude, whizzed or hot pressed, £5 5s. to £6 5s. per ton; purified crystals, £14 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £6 per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £15 per ton f.o.b.

**PITCH.**—Medium, soft, 33s. per ton, f.o.b. MANCHESTER: 32s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.

**PYRIDINE.**—90/140%, 13s. 6d. to 15s. per gal.; 90/160%, 10s. 6d. to 13s. 3d. per gal.; 90/180%, 3s. 3d. to 4s. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 10s. to 11s. 6d. per gal.

**TOLUOL.**—90%, 1s. 10d. per gal.; pure, 2s. 2d. GLASGOW: 90%, 120, 1s. 10d. to 2s. 1d. per gal.

**XYLOL.**—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 3d. to 2s. 3½d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

### Wood Distillation Products

**CALCIUM ACETATE.**—Brown, £7 5s. to £9 15s. per ton; grey, £9 5s. to £9 15s. MANCHESTER: Brown, £8 10s.; grey, £10.

**METHYL ACETONE.**—40.50%, £35 to £40 per ton.

**WOOD CREOSOTE.**—Unrefined, 4d. to 6d. per gal., according to boiling range.

**WOOD NAPHTHA, MISCIBLE.**—3s. 3d. to 3s. 6d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.

**WOOD TAR.**—£2 to £8 per ton, according to quality.

### Intermediates and Dyes

**ANILINE OIL.**—Spot, 8d. per lb., drums extra, d/d buyer's works.

**ANILINE SALTS.**—Spot, 8d. per lb. d/d buyer's works, casks free.

**BENZIDINE, HCl.**—2s. 7½d. per lb., 100% as base, in casks.

**BENZOIC ACID.** 1914 B.P. (ex toluol)—1s. 11½d. per lb. d/d buyer's works.

**m-CRESOL 98/100%.**—1s. 8d. to 1s. 9d. per lb. in ton lots.

**o-CRESOL 30/31° C.**—6½d. to 7½d. per lb. in 1-ton lots.

**p-CRESOL, 34.5° C.**—1s. 7d. to 1s. 8d. per lb. in ton lots.

**DICHLORANILINE.**—2s. 1½d. to 2s. 5½d. per lb.

**DIMETHYLANILINE.**—Spot, 1s. 7½d. per lb., package extra.

**DINITROBENZENE.**—8½d. per lb.

**DINITROCHLOROBENZENE, SOLID.**—£79 5s. per ton.

**DINITROTOLUENE.**—48/50° C., 9½d. per lb.; 66/68° C., 11d.

**DIPHENYLAMINE.**—Spot, 2s. 2d. per lb., d/d buyer's works.

**GAMMA ACID.** Spot, 4s. 4½d. per lb. 100% d/d buyer's works.

**II ACID.**—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.

**NAPHTHIONIC ACID.**—1s. 10d. per lb.

**β-NAPHTHOL.**—£97 per ton; flake, £94 8s. per ton.

**α-NAPHTHYLAMINE.**—Lumps, 1s. 1d. per lb.

**β-NAPHTHYLAMINE.**—Spot, 3s. per lb.; d/d buyer's works.

**NEVILLE AND WINTER'S ACID.**—Spot, 3s. 3½d. per lb. 100%.

**o-NITRANILINE.**—4s. 3½d. per lb.

**m-NITRANILINE.**—Spot, 2s. 10d. per lb. d/d buyer's works.

**p-NITRANILINE.**—Spot, 1s. 10d. to 2s. 3½d. per lb. d/d buyer's works.

**NITROBENZENE.**—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

**NITRONAPHTHALENE.**—10½d. per lb.; P.G., 1s. 0½d. per lb.

**SODIUM NAPHTHIONATE.**—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.

**SULPHANILIC ACID.**—Spot, 8½d. per lb. 100%, d/d buyer's works.

**o-TOLUIDINE.**—11½d. per lb., in 8/10-cwt. drums, drums extra.

**p-TOLUIDINE.**—2s. per lb., in casks.

**m-XYLIDINE ACETATE.**—4s. 8d. per lb., 100%.

## COMPANY MEETING.

## British Alkaloids Limited

### Manufacturers of "T.C.P."

#### Continued Progress

The ninth ordinary general meeting of British Alkaloids, Ltd., was held on Monday, May 30, at Winchester House, Old Broad Street, E.C., Sir Ivor Phillips, K.C.B., D.S.O. (the chairman), presiding.

The Chairman said that the company had experienced a very satisfactory trading year. They had every reason to congratulate themselves on the net profit of £55,410—46 per cent. higher than a year ago. The Board recommended final dividends of 17.19 per cent., less tax, on the 8 per cent. participating preference shares, making 25.19 per cent. for the year, and 30 per cent., less tax, on the ordinary shares, making a total of 42 per cent., less tax, for the year.

During the year under review total sales advanced by more than 37 per cent. over those of the previous year and, by the installation of additional machinery, coupled with a larger output, it had been made possible to prevent costs rising appreciably. The export trade for the past year showed an increase of 88 per cent.

The therapeutical value of "T.C.P." and its allied products had been strikingly in evidence during the year, unmistakably manifest from the testimony voluntarily contributed by the medical and dental professions and the public in general, which had proved most useful and informative to them. Continually increasing sales were the result of this growing knowledge of "T.C.P." gained in the field of practical experience, and the humane and good-natured desire that by spreading the news mankind should profit by the discovery. He would like to emphasise this to shareholders all of whom have, no doubt, from time to time, benefited by the use of T.C.P. A few had written and told us so and we do hope that all shareholders will make similar contributions to our records, testifying to the results they have obtained, so adding to or supporting our knowledge, and assisting the labours of our chemists, medical men and agents who are ever ungrudgingly working in your interests and with results which must be very gratifying to you.

Sales for April, the first month of the current financial year, showed an increase of 33½ per cent. as compared with the corresponding month of 1937, and a similar comparison for May gave an increase of over 49 per cent.

#### Progressive Sales

Their friends, the retail chemists, through their personal experience and knowledge of "T.C.P." and allied products, had gained the utmost confidence in them as exceptionally efficacious in the uses for which they were recommended, and the Board had to place on record their strong appreciation of their co-operation. Personal recommendations which denoted the efficacy of "T.C.P." were largely responsible for creating the demand so consistently progressive. The Board considered that sales built up on the merits of the product were infinitely valuable and the only true foundation for future continued prosperity.

He mentioned last year that the sales of each month of the year then under review showed an increase over the corresponding months of the previous year, and that he hoped to be able to say the same this year. He was happy to do so with a single exception—one month out of the 12 fell slightly short—but shareholders had the satisfaction of knowing that the comparative figure related to a month during the year 1936-37 when the country was stricken by an influenza epidemic, and "T.C.P." was consequently in abnormal request.

The veterinary side of the business was still expanding. Veterinary surgeons and breeders had shown such interest in "T.C.P." that they confidently hoped that this important branch of their activities would continue to expand. Last year he was able to tell them that in consequence of the great benefits derived from the use of "T.C.P." in dog ailments they had compiled a booklet on dogs, and now they had also a small booklet dealing with cats and the many directions in which "T.C.P." was of service. These booklets would be sent post free to all applying for them.

The report and accounts were adopted.

## Company News

**Lovering China Clays** have improved their profit and loss position by reducing the debit balance during the year by approximately £27,200.

**Trinidad Central Oilfields** have maintained the dividend for 1937 on the £287,894 issued capital at 6 per cent., less tax. The report and accounts will be posted on or about June 9.

**Metals Penetrations** have increased their nominal capital by the addition of £2,000, beyond the registered capital of £1,000. The additional capital is divided into 1,700 ordinary and 300 5 per cent. non-cumulative preference shares of £1.

**Goodlass Wall and Lead Industries** made a trading profit for 1937 of £266,569, as against £275,082 for the preceding year. In addition to a dividend of 6 per cent., less income tax, a bonus of 1 per cent., less income tax (as in 1937) is being paid on the ordinary shares. The balance carried forward at £82,938 is about £4,000 more than the amount brought in.

**Anglo-American Oil Company** in their report for 1937, disclose net profits after taxation of £816,601, compared with £582,798 for 1936. A dividend of 4 per cent., tax free, has been paid on the issued capital of £10,500,000, absorbing £420,000, this comparing with 5 per cent., less tax, for 1936, on the smaller capital requiring £177,869. During the year reserves amounting to £5,283,288 were capitalised. The issued capital was also increased by £546,302, these two operations raising the issued capital from £4,665,410 to £10,500,000.

**British Oxygen Company** intend to increase preference capital and make an issue at an early date. The new finance is required for purposes of the company's extension programme. Full details will be issued shortly. The consolidated profit of the organisation as shown in the accounts for last year amounts to £1,160,181, as compared with £995,781 in the year 1936. A final dividend of 10 per cent. (subject to income tax), is to be paid on the ordinary stock, making a total of 17 per cent., as compared with 15 per cent. last year. The carry forward is £44,385.

**Zinc Corporation** have declared a final participating dividend of 4s. 6d. per share on both the preference and ordinary shares, less income-tax at 3s. 6d. in the £, for the year 1937. This is equivalent to 45 per cent. on the ordinary shares, making 85 per cent. in all for 1937, compared with 60 per cent. for 1936, and 22½ per cent. on the preference, making the total participating payment for the year 42½ per cent., against 30 per cent. the year before. The directors have also declared a dividend of 2s. per share, or 10 per cent., on the preference shares, less income-tax at 3s. 2d. in the £, being the fixed preferential dividend for the first six months of 1938.

## Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

### Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an \*—followed by the date of the Summary, but such total may have been reduced.)

**BABBITT PRODUCTS, LTD.**, London, N.W., manufacturers of soap, etc. (M., 4/6/38.) May 20, £150 debentures, part of a series already registered.

**E. P. BRAY & CO., LTD.**, Welwyn Garden City, manufacturers of synthetic resin products, etc. (M., 4/6/38.) May 24, £450 debentures; general charge.

**LAUTARO NITRATE CO., LTD.**, London, E.C. (M., 4/6/38.) May 18, mortgage, to Labour Accidents Department, National Savings Bank, Santiago, securing 2,500,000 Chilean pesos; charged on land at port of Antofagasta, Chile. \*£7,575,911, \$2,500,000 Chilean currency. January 13, 1938.

### Satisfaction

**LAUTARO NITRATE CO., LTD.**, London, E.C. (M.S., 4/6/38.) Satisfaction May 18, 2,000,000 Chilean Pesos, registered April 28, 1932.

### County Court Judgments

**DR. W. GORDON HANNA, LTD.**, R/O, Peel Laboratories, Hindle Street, Accrington, manufacturing chemists. (C.C., 4/6/38.) £59 1s. 1d. April 22.

